MINERAL WATER CHEMISTRY, GREAT LAKES

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INTRODUCTION

The work on "Mineral Water Chemistry, Great Lakes" was carried out at Syracuse University (WP-00868) and The University of Michigan (WP-1303).

Ship support was given by the Great Lakes Institute, University of Toronto, the Great Lakes Research Division, The University of Michigan, and the Department of Energy, Mines, and Resources, Canada.* In addition small boats equipped for laboratory analysis were used.

Personnel involved in this project included: Francoise Mauray (lab. technician), Jeffrey Sutherland (PhD thesis); Philip Snow (MSc thesis); Timothy Kurtz, John Owen, Peter Lyttle and James Briggs (student assistants). Sutherland's PhD thesis and Snow's MSc thesis are available through Syracuse University. Other papers from this study are:

"Mineral Water Equilibria, Great Lakes: Silica and Phosphorus." Publ. No. 15, Great Lakes Res. Div., The University of Michigan, 1966, pp. 439-445.

"Equilibrium Models and the Composition of the Great Lakes." American Chem. Soc., Advances in Chem., Publ. 67, 1967, pp. 243-254.

"Mineral Water Equilibria in Silicate Weathering." Proc., XXIII Int'l Geol. Congress, Sect. 6, Prague, Czechoslovakia.

The purpose of this study was:

(1) To ascertain the chemistry of master variables in the Great Lakes.

(2) To ascertain the degree of saturation of the water with respect to specific minerals.

(3) To develop an equilibrium model for the Great Lakes.

*Dr. K. D. Card, Ontario Department of Mines, and the Sudbury Office Department of Lands and Forests, provided logistic support for the Lake Onaping program.

EQUIPMENT DESIGN AND MODIFICATIONS

ABSTRACT

Certain commercial laboratory equipment was modified for use in the field, in small boats, and large boats. A Corning pH 12 meter was modified for battery operation; phosphate, carbonate, and silicate procedures were designed for "on the spot" analysis. A large volume sampler (24 liter) was designed for bottom and surface water sampling, and a pump operated sampling system was designed for continuous profile and large volume sampling. A multiprobe high impedance switch was built to read three electrodes on a pH meter.

pH METER

The pH meter is probably the key tool for chemical investigations. pH, alkalinity, Na^+, and K^+ are measured using this instrument.

A Corning pH 12 meter on expanded scale has a sensitivity and readability of 0.001 pH unit. Field tolerance is accepted as 0.005 unit. The instrument normally operates on grounded (shielded) 110 VAC. Two modifications were employed for small boat and field operations. A battery pack of rechargeable Ni-Cd batteries of +15, -15, 0, 120 V (good for 40 hours continuous operation) were used in the circuit. In this case the pH meter ground is connected to the metal case of the batteries which acts like a capacitor. Excellent stability and reproducibility results. This design is good for all operations where the batteries can be recharged on a reasonable schedule.

An alternate procedure is to use a 12 V wet cell battery, a 12 VDC-110 VAC inverter and the meter. The pH meter ground is made via a reference electrode (in a float) partially submerged in the lake. The instrument is stable enough that an inexpensive square wave inverter may be used. An extra load on the inverter may be required to prevent transformer saturation since the pH meter requires little power. If pH is to be recorded, a sine wave inverter is required for recorders. Because of weight this device is limited to small boats equipped with battery charging devices.

Recorders are often advantageous in small boats since a swell will cause the needle to fluctuate. Alternately a digital readout meter may be used. An Orion 900 digital display meter was used in a 17-foot boat with excellent results.

All pH meters are equipped with only one electrode input. A good quality ceramic switch well shielded was built so that the meter could read three electrode pairs without changing electrodes. Trimpots were used for zeroing of each

channel. This device worked quite well in the field and in the laboratory.

LARGE VOLUME SAMPLER

A large volume sampler of a modified Van Dorn design was constructed to obtain samples for filtration of particle matter. Polyvinyl chloride plastic was used throughout. A section of 15-in. diameter tubing tapered to 4-in. tubing at both ends. "O" ring "damper" valves were spring loaded in each of the 4-in. tubes. A spring loaded triggering device released the valves either by messenger or by triggering from the bottom. The device was designed so it could be readily taken apart and cleaned.

A WATER PUMP

A Moyno plastic and rubber positive pressure pump was used with 25-mm rubber hose for continuous profile sampling and large volume sampling. Master variables (pH, dissolved oxygen, temperature) could be read continuously and sampling depth is more appropriately defined from the results. The pump running at 1000 rpm produced a flow of 20 ℓ/h. Biomass sampling and particulate matter sampling were also carried out using standard nets and filtering devices. In use a plastic container 0.7 meter in diameter and 0.3 meter deep catches the outflow for continuous measurement of variables. This apparatus was particularly suitable for analysis of bottom waters of Lake Erie.

ANALYTICAL PROCEDURES

ABSTRACT

EDTA titration was used for analysis of Ca and Mg; Na and K were analyzed in the field using electrodes; Si was analyzed in the field using the molybdenum blue technique, P was analyzed in the field by extraction of molybdenum blue in isobutanol; F^- and H^+ were measured using electrodes; alkalinity was calculated after titration with acid and measurement of pH, $SO_4^=$ was measured by titration with $BaCl_2$ using thorin as an indicator and measuring the end point photometrically.

Ca AND Mg

The standard EDTA titration was used for Ca and Ca + Mg. A 10-20 gram sample is weighed on a direct reading balance (10-mg sensitivity), 1-2 ml of 2N NaOH are added, hydroxy-naphthol-blue to color the solution, and the solution is titrated to a blue color using 0.001M EDTA. Reproducibility is 2%.

Ca + Mg are determined by taking a 10-20 gram sample buffering to pH 10 with NH_4 - NH_4OH, and titrating with EDTA using calmagite as an indicator to a blue color. Reproducibility is 0.3%. Mg is determined by difference.

Na AND K

A Corning Na electrode and a Beckman cation electrode were used to determine Na and Na + K, respectively. Both electrodes work without H^+ interference (at lake levels of Na and K) above a pH of 8. Therefore one drop of a saturated solution of Ca(OH) is added to each sample. The selectivity of the cation electrode is determined by measuring the "pH" of a 0.01N K^+ solution and of a 0.01N Na^+ solution. The difference gives the selectivity constant. The Nernst equation for the electrode is:

$$\frac{E-E_O}{\frac{RT}{F}} = \log\left[(Na^+)+C(K^+)\right]$$

where $(E-E_O)/RT/F$ is the measured pH, (Na^+) is the activity (concentration) of Na^+, (K^+) is the activity of potassium, and C is the selectivity constant. For the 0.01N Na^+ reading this becomes

$$\frac{\frac{E_1-E_o}{RT}}{F} = \log (0.01)$$

For the 0.01N K^+ reading this becomes

$$\frac{\frac{E_2-E_o}{RT}}{F} = \log C + \log 0.01$$

Subtracting the two, one gets

$$- pH_{Na^+} + pH_{K^+} = \log C \quad (1)$$

In practice a Na electrode was connected to one input, a potassium electrode to another input, and a common Ag - AgCl reference electrode was used. pNa and pK values were measured on the pH scale. A simple calculation using Eq. (1) gave the pH_{K^+}.

The slope of the electrodes is not always ideal—59 mv at 25°C. Most electrodes are between 55-60 mv/decade. The pH scale span may be adjusted once the slope is determined (using different solutions) using the temperature knob.

In use the electrodes deviated from flame analysis by 2%.

SILICA

Silica was measured in the field by development of the molybdenum blue color and measurement in 1-in. tubes on a battery operated spectronic 20 colorimeter.

The procedure is:

(a) Make a 50 ppm SiO_2 standard by fusing quartz in lithium metaborate and storing at a pH of 1.5.

(b) To 10 ml of a 5 ppm standard, a blank, and samples add 3.3 ml of 1N H_2SO_4 and 3.3 ml of ammonium molybdate solution (2.65 gr ammonium molybdate in 40 ml of water, adjusted to pH 8-9 with NaOH and brought to a total of 50 ml).

Read the transmittance at 400 mμ with the blank at 100 transmittance. Calculate the absorbance from 2-log T, where T is the transmittance; calculate the SiO_2 concentration from

$$SiO_2(\text{ppm}) = \frac{A_W}{A_S} \times 5$$

where A_W is the absorbance of the sample and A_S is the absorbance of the standard. This expression is valid to 20 ppm (SiO_2). More concentrated solutions may be diluted and analyzed. Reproducibility is 1%.

PHOSPHATE

Available orthophosphate was measured upon receipt of sample by extraction with isobutanol of the phospho-molybdate color.

The procedure is:

(a) Make a stock solution of 1000 ppb(P) from KH_2PO_4. Dilute 100 times for a 10 ppb(P) standard.

(b) Preweigh 50-100 vials of 1.08 gram of ascorbic acid. Store in the dark.

(c) Make a stock solution (A) of 2 liters of ammonium molybdate (60 gram ammonium molybdate, F.W. = 1236 in 2 ℓ), 1 liter potassium antimony tartrate (1.36 gr in 1 liter) and 5 liters of 5N H_2SO_4.

A working solution is made up for each analytical batch by adding a 1.08 gr ascorbic acid vial to 80 ml of stock A and diluting to 100 ml in a graduated flask.

Add 10 ml of working solution to 100 ml of blank, 10 ppb(P) standard and samples in a 200 ml separatory funnel. Mix by shaking.

Add 20 ml of isobutanol, shake, drain off the aqueous layer and add the isobutanol extract to a 1-in. test tube with 1 ml of ethanol. Measure the transmittance at 690 mμ. Determine the absorbance. The concentration of orthophosphate is given by,

$$P(\text{ppb}) = \frac{A_W}{A_S} \times 10$$

where A_W is the absorbance of the sample, A_S is the absorbance of the 10 ppb(P) standard. This relationship is valid to 20 ppb(P). Detectability is 0.5 ppb(P). Reproducibility is 3%.

Samples for phosphate analysis should never be stored as change will take place. In addition fresh distilled water should always be used. A sample of Lake Ontario water was taken in 1966 three miles off Rochester, New York and

repeatedly analyzed after storing in a polyethylene bottle at room temperature (approximately 20°C). The results are:

Time After Sampling	Apparent P(ppb)
0 hr	5.9
1 hr	6.6
2 hr	10.0
5 hr	14.8
24 hr	50.6
120 hr	245.0
240 hr	288.0

FLUORIDE AND HYDROGEN IONS

Fluoride ion was measured using an Orion electrode, and hydrogen ion was measured using a Corning rugged combination electrode. As with all electrodes, these were soaked for at least 24 hours in lake water; if the reference electrode was stored dry, it was soaked in hot water and the "wick" area was rubbed with a finger repeatedly to insure there was no closure. Generally 2 or 3 reference electrodes were used to insure proper operation before any readings were made.

A sample was adjusted to a pH 5-6 (if needed) and fluoride was measured on the pH scale after proper calibration. Reproducibility of the electrode is about 2% and detectability is better than 0.01 ppm F.

Generally two pH measurements are required on each sample, that of the sample (pH 5-9) and that of the sample after acid has been added for alkalinity determination (pH 3-4). Two separate electrodes were used for these measurements and were stored in solutions (waste) near the pH to be measured. The reference portion of the electrode to measure was kept low in KCl solution, and the electrode was brought to a temperature near that of the sample. This allowed little temperature drift while the solution was exposed to the atmosphere during the reading. The electrode was checked against buffers before and after each reading, washed with sample water but never dried. Reproducibility is 0.01 pH unit.

SULFATE

Sulfate is analyzed by titrating a sample with $BaCl_2$ with thorin as indicator after all cations have been removed in a H ion exchange resin.

The procedure is:

To cation exchange column (50 mesh) in acid form, pass 20 ml of sample,

collect the last 5 ml. Add 20 gram of solution (0.832 gr sodium acetate, 0.025 gr thorin, 12.75 gr of acetic acid in 500 ml of ethanol); stir well, set the spectrometer at 520 mμ and an absorbance of 0.1, titrate with $BaCl_2$ (10 ppm SO_4) until the absorbance is 0.2. The $SO_4^=$ concentration is

$$SO_4^=(\text{ppm}) = 2V$$

where V is the volume of $BaCl_2$ used. The detectability is 1 ppm $SO_4^=$ and the reproducibility is 2%.

ALKALINITY

Alkalinity is the sum of the weakly dissociated negative ions above a pH of 4. This for almost all waters is equal to the $(HCO_3^-)+2(CO_3^=)$ concentrations.

A 20 ml sample is mixed with 1-5 ml of 0.01 N HCl and the pH is read above 3 but less than 4. The alkalinity is

$$\text{Alkalinity (meq}/\ell) = \frac{H_A V_A - H_f(V_A+V_s)}{V_s}$$

where H_A is the concentration of acid (equiv/ℓ); V_A is the volume of acid (ml); H_f is the final hydrogen ion concentration (equiv/ℓ), and V_s is the sample volume (ml).

CALCULATIONS AND RESULTS

ABSTRACT

A computer program uses major and minor ion concentration to determine the degree of saturation of lake water with respect to $CaCO_3$, $CaMg(CO_3)_2$, $Ca_{10}(PO_4)_6(OH)_2$, air and oxygen and carbon dioxide, and various alumino-silicates. Factor analysis of combined chemical and biological data for Lake Erie shows it to be fundamentally an oxygen deficient CO_2 excess body of water suggesting major pollution reactions are of the type

$$\text{carbon wastes} + O_2 \rightarrow CO_2 \ .$$

Water is saturated with respect to hydroxyapatite during summer months but phosphate is removed after the lake overturns in the fall.

Granite waters of northern Lake Huron change markedly upon encountering limestone waters of Lake Huron.

DATA FOR GREAT LAKES

Data were collected for Lakes Erie and Ontario on a lake-wide basis in spring, summer, and fall. A detailed study of low population granite terrane waters was carried out in northern Lake Huron and carried down into limestone areas of Lake Huron. In addition specific inland lakes were studied.

During one cruise (E-67-04) of Lake Erie, during July 4-7, 1967, plankton were collected at various depths and analyzed along with water which was analyzed raw as well as filtered through 0.45 mμ Millipore filters. Plankton were obtained by pumping 5 gallons of water through a number 0 net. The resulting data were analyzed using Varimax rotation factor analysis to ascertain master variables.

Zooplankton samples* were stored in buffered 10% formalin. For identification samples were diluted to 20 ml with 5% formalin. One-ml aliquots were pipetted into a Sedgwick-Rafter cell. Enumeration was made at 100X on one-fourth of the total volume. The classification was based at suborders and consisted of <u>Daphnia</u>, <u>immature</u> <u>Daphnia</u>, <u>Bosminada</u>, <u>Calanoida</u>, <u>Cyclopoda</u>, <u>Leptodora</u>, <u>Nauplius</u>, and <u>Rotifera</u>. Biomass determination was made by taking 10 ml of the remaining 19 ml of sample and evaporating to constant weight in tared dishes. Values

*Analysis was done by Mr. Nels Conroy, Ontario Water Resources Commission, Elliot Lake, Ontario.

were converted to mg of biomass per liter of water.

Data are presented as follows:

Lake Erie:

E 66-04	August 22-26, 1966.	Entire lake.
E 66-06	November 14, 1966.	Entire lake (after turnover).
E 67-04	July 4, 1967.	Biology and chemistry, entire lake.

Lake Ontario:

0-65-11	November 29, 1965.	Part of lake.
0-66-01	January 23, 1966	Eastern half.

Lake Huron:

H-66-78	Summer 1966.	North channel, chemistry, and interstitial water of sediments.
H-67-1	Summer 1967.	Northern Lake Huron.

Lake Onaping:

	Summer, 1967.	A granitic inland lake.

Lake Agnew:

	1967.	A granite-diabase inland lake.

The columns of data from left to right are latitude and longitude (expressed in degrees and minutes to one-tenth minute), cruise designation, station number, depth in meters (if depth is negative it is an interstitial water analysis of a core with depth in meters), temperature in degrees centigrade, conductivity at 25°C in 10^{-6} mohs, pH, alkalinity (mequiv/ℓ), dissolved oxygen in ppm, $pS^{=}$ (not measured), orthophosphate (ppb P); SiO_2(ppm), Cl^-(ppm), $SO_4^{=}$(ppm), Na^+(ppm), K^+(ppm), Ca^{+2}(ppm), Mg^{+2}(ppm), F^-(ppm), and station comments. If a -1 is entered for concentration data, the analysis was not carried out.

Analysis of the raw data show the following trends:

(a) Orthophosphate decreases markedly after fall turnover of Lake Erie (see cruise E 66-04 vs E 66-06).

(b) The influence of more dilute Lake Huron—Detroit River water can be seen throughout the western basin of Lake Erie.

(c) Chloride ion concentration of all ions increases from west to east in Lake Erie suggesting an increasing input into Lake Erie and/or an increasing net evaporation rate from the surface.

LAKE ERIE PTE. DAUPHINE 8/22-26/66. SYNOPTLC + CORE + SI + PHOS.-JCS+PS

I	LAT	LONG	CRUIS	ST	DEPTH	TEMP	CON	PH	ALK	O2	PS	PHOS	SIO2	CL	SO4	NA	K	CA	MG	F	STATION COMMENT
	--DEG,	MIN*10.--			M	C	MUMHO		MEQ/L	PPM		PPB(P)	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	
1	42 590	82 243	E6604	0	.0	26.5	-1	8.46	1.67	-1.0	-1.0	18.0	-1.0	10.4	16.4	3.4	1.0	27.2	7.3	.08	SURFACE ST CLAIR
2	42 575	82 255	E6604	0	.0	22.0	-1	8.34	1.69	-1.0	-1.0	2.0	-1.0	10.1	16.0	3.3	1.0	26.6	7.9	.07	SURFACE ST CLAIR
3	42 523	82 285	E6604	0	.0	22.0	-1	8.30	1.64	-1.0	-1.0	6.0	-1.0	10.7	14.5	3.4	1.1	27.2	7.0	.10	SURFACE ST CLAIR
4	42 471	82 283	E6604	0	.0	22.0	-1	8.38	1.62	-1.0	-1.0	3.0	-1.0	11.1	15.6	3.5	1.0	26.9	7.3	.07	SURFACE ST CLAIR
5	42 353	82 330	E6604	0	.0	22.0	-1	8.34	1.64	-1.0	-1.0	4.0	-1.0	13.9	16.0	4.7	1.0	27.2	7.6	.09	SURFACE ST CLAIR
6	42 291	82 433	E6604	0	.0	23.0	-1	8.35	1.69	-1.0	-1.0	3.0	-1.0	13.9	16.0	5.1	1.1	28.1	7.2	.08	SURFACE ST CLAIR
7	42 218	82 540	E6604	0	.0	24.0	-1	8.34	1.75	-1.0	-1.0	6.0	-1.0	13.1	15.3	4.3	1.0	27.2	8.0	.09	SURFACE ST CLAIR
8	42 188	83 45	E6604	0	.0	25.0	-1	8.37	1.71	-1.0	-1.0	4.0	-1.0	15.8	16.1	5.5	1.0	28.0	7.4	.13	SURFACE ST CLAIR
9	41 568	83 71	E6604	1	.0	24.0	203	8.03	1.74	-1.0	-1.0	32.0	1.9	18.6	18.0	6.0	1.1	29.7	7.4	.10	
10	41 568	83 71	E6604	1	6.0	24.0	204	7.98	1.74	7.6	-1.0	37.0	2.0	17.8	17.0	5.9	1.0	28.2	7.3	.15	
11	41 539	83 46	E6604	3	.0	24.0	220	8.35	1.74	-1.0	-1.0	25.0	1.8	25.4	17.6	8.8	1.3	30.4	8.0	.16	
12	41 539	83 46	E6604	3	8.0	24.0	228	8.24	1.65	8.5	-1.0	38.0	2.0	25.7	18.3	8.9	1.1	30.2	7.3	.14	
13	41 476	83 4	E6604	5	.0	24.0	220	8.52	1.63	-1.0	-1.0	18.0	1.2	26.5	18.3	8.4	1.0	30.4	8.0	.13	
14	41 476	83 4	E6604	5	8.0	28.0	220	7.05	1.82	8.8	-1.0	-1.0	1.3	25.6	17.0	8.3	1.1	30.2	7.9	.15	
15	41 476	83 4	E6604	5	9.0	25.0	227	8.60	1.63	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.00	
16	41 510	82 522	E6604	7	.0	25.0	215	8.60	1.63	-1.0	-1.0	7.0	.8	23.4	18.9	7.6	1.1	30.4	8.1	.17	
17	41 510	82 522	E6604	7	9.0	25.0	216	8.66	1.75	9.1	-1.0	6.0	.8	24.2	19.5	7.7	1.1	31.0	7.2	.13	
18	41 395	82 349	E6604	10	.0	25.0	263	8.62	1.89	-1.0	-1.0	5.0	-1.0	34.1	26.9	10.6	1.3	36.6	8.8	.20	
19	41 321	82 352	E6604	11	.0	25.0	272	8.60	1.84	8.5	-1.0	5.0	-1.0	38.6	26.1	12.0	1.4	39.2	8.2	.20	
20	41 384	81 514	E6604	26	.0	23.0	269	8.50	1.84	-1.0	-1.0	3.0	.2	34.8	25.1	11.6	1.5	38.6	8.8	.17	
21	41 384	81 514	E6604	26	20.0	23.0	271	8.60	1.89	9.4	-1.0	3.0	.3	35.5	25.4	11.2	1.4	37.8	9.6	.18	
22	41 334	81 452	E6604	28	.0	24.0	265	8.40	1.80	-1.0	-1.0	3.0	.5	35.4	25.0	11.7	1.6	39.2	8.6	.17	
23	41 334	81 452	E6604	28	14.0	24.0	265	8.58	1.72	8.6	-1.0	4.0	.3	34.8	25.2	11.3	1.3	37.9	8.3	.15	
24	41 376	81 375	E6604	29	.0	23.0	265	8.40	1.78	-1.0	-1.0	2.0	-1.0	37.0	26.0	11.5	1.5	39.2	9.1	.14	
25	41 528	81 460	E6604	33	.0	23.0	265	8.34	1.91	-1.0	-1.0	3.0	-1.0	36.5	25.5	11.1	1.3	37.1	9.3	.14	
26	42 176	81 476	E6604	38	.0	22.0	262	8.50	1.38	-1.0	-1.0	3.0	-1.0	32.7	25.0	11.1	1.5	36.9	9.0	.17	
27	41 533	81 5	E6604	50	.0	22.0	272	8.37	1.87	-1.0	-1.0	5.0	-1.0	37.2	24.4	11.6	1.5	39.2	9.5	.16	
28	41 533	81 5	E6604	50	14.0	22.0	267	8.47	1.82	-1.0	-1.0	5.0	-1.0	36.6	25.2	12.0	1.6	39.2	9.8	.17	
29	42 153	80 492	E6604	55	.0	22.0	264	7.61	2.14	-1.0	-1.0	2.0	-1.0	33.2	-1.0	10.9	1.3	37.1	8.9	.14	
30	42 153	80 492	E6604	55	20.0	22.0	282	7.38	2.27	-1.0	-1.0	7.0	-1.0	35.9	25.5	11.5	1.5	39.8	8.9	.14	
31	42 63	80 185	E6604	66	.0	22.0	269	8.31	2.10	-1.0	-1.0	5.0	-1.0	36.9	24.9	11.5	1.4	37.9	8.8	.14	
32	42 168	80 91	E6604	67	.0	23.0	-1	8.37	2.14	-1.0	-1.0	2.0	-1.0	35.1	23.9	11.5	1.7	37.4	8.8	.14	
33	42 168	80 91	E6604	67	26.0	15.0	-1	8.37	2.10	9.0	-1.0	2.0	-1.0	36.4	25.0	11.5	1.5	40.0	8.5	.15	
34	42 326	80 24	E6604	99	.0	21.0	-1	8.23	1.37	-1.0	-1.0	6.0	-1.0	34.9	26.1	11.2	1.7	37.5	9.5	.22	NOT OFFICIAL STAT
35	42 418	80 37	E6604	73	19.0	5.0	-1	7.67	1.96	9.1	-1.0	16.0	-1.0	-1.0	-1.0	11.2	1.7	37.5	8.7	.32	
36	42 418	80 37	E6604	73	19.5	5.0	-1	7.61	1.12	-1.0	-1.0	290.0	-1.0	35.9	-1.0	11.2	1.7	37.5	8.7	.32	
37	42 418	80 37	E6604	73	19.7	5.0	-1	7.62	1.32	-1.0	-1.0	110.0	-1.0	-1.0	26.3	11.2	1.7	37.5	8.7	.32	
38	41 510	82 522	E6604	7	9.0	25.0	216	8.66	1.75	9.1	-1.0	6.0	.5	24.2	19.5	7.7	1.1	31.0	7.2	.13	SILICA FILTERED
39	41 384	81 514	E6604	26	.0	23.0	269	8.50	1.84	-1.0	-1.0	3.0	.4	34.8	25.1	11.6	1.5	38.6	8.8	.17	SILICA FILTERED
40	42 418	80 37	E6604	73	-.0	11.0	-1	7.24	3.36	-1.0	-1.0	-1.0	10.0	-1.0	-1.0	12.3	1.9	51.6	8.4	-1.00	JCS CORE
41	42 418	80 37	E6604	73	-2.5	11.0	-1	6.63	3.34	-1.0	-1.0	-1.0	20.0	-1.0	-1.0	14.3	5.6	45.6	10.3	-1.00	JCS CORE
42	42 590	82 243	E6604	0	.0	26.5	-1	8.46	1.67	-1.0	-1.0	19.1	-1.0	10.4	16.4	3.4	1.0	27.2	7.3	.08	PHOSPHATE FILT. /
43	42 575	82 255	E6604	0	.0	22.0	-1	8.34	1.69	-1.0	-1.0	1.5	-1.0	10.1	16.0	3.3	1.0	26.6	7.9	.07	PHOSPHATE FILT. 0
44	42 523	82 285	E6604	0	.0	22.0	-1	8.30	1.64	-1.0	-1.0	3.0	-1.0	10.7	14.5	3.4	1.1	27.2	7.0	.10	PHOSPHATE FILT. 0
45	42 471	82 283	E6604	0	.0	22.0	-1	8.38	1.62	-1.0	-1.0	1.2	-1.0	11.1	15.6	3.5	1.0	26.9	7.3	.07	PHOSPHATE FILT. 0
46	42 353	82 330	E6604	0	.0	22.0	-1	8.34	1.64	-1.0	-1.0	2.0	-1.0	13.9	16.0	4.7	1.0	27.2	7.6	.09	PHOSPHATE FILT. 0
47	42 291	82 433	E6604	0	.0	23.0	-1	8.35	1.69	-1.0	-1.0	1.0	-1.0	13.9	16.0	5.1	1.1	28.1	7.2	.08	PHOSPHATE FILT. 0
48	42 218	82 540	E6604	0	.0	24.0	-1	8.34	1.75	-1.0	-1.0	1.5	-1.0	13.1	15.3	4.3	1.0	27.2	8.0	.09	PHOSPHATE FILT. 0
49	42 188	83 45	E6604	0	.0	25.0	-1	8.37	1.71	-1.0	-1.0	1.6	-1.0	15.8	16.1	5.5	1.0	28.0	7.4	.13	PHOSPHATE FILT. 0
50	41 568	83 71	E6604	1	.0	24.0	203	8.03	1.74	-1.0	-1.0	22.0	1.9	18.6	18.0	6.0	1.1	29.7	7.4	.10	PHOSPHATE FILT. 0
51	41 568	83 71	E6604	1	6.0	24.0	204	7.98	1.74	7.6	-1.0	25.0	2.0	17.8	17.0	5.9	1.0	28.2	7.3	.15	PHOSPHATE FILT. 0
52	41 539	83 46	E6604	3	.0	24.0	220	8.35	1.74	-1.0	-1.0	20.5	1.8	25.4	17.6	8.8	1.3	30.4	8.0	.16	PHOSPHATE FILT. 0
53	41 539	83 46	E6604	3	8.0	24.0	228	8.24	1.65	8.5	-1.0	25.5	2.0	25.7	18.3	8.9	1.1	30.2	7.3	.14	PHOSPHATE FILT. 0
54	41 510	82 522	E6604	7	.0	25.0	215	8.60	1.63	-1.0	-1.0	2.0	.8	23.4	18.9	7.6	1.1	30.4	8.1	.17	PHOSPHATE FILT. 0
55	41 510	82 522	E6604	7	9.0	25.0	216	8.66	1.75	9.1	-1.0	3.5	.8	24.2	19.5	7.7	1.1	31.0	7.2	.13	PHOSPHATE FILT. 0
56	41 395	82 349	E6604	10	.0	25.0	263	8.62	1.89	-1.0	-1.0	2.5	-1.0	34.1	26.9	10.6	1.3	36.6	8.8	.20	PHOSPHATE FILT. 0
57	41 321	82 352	E6604	11	.0	25.0	272	8.60	1.84	-1.0	-1.0	3.0	-1.0	38.6	26.1	12.0	1.4	39.2	8.2	.20	PHOSPHATE FILT. 0
58	41 384	81 584	E6604	26	.0	23.0	269	8.50	1.84	-1.0	-1.0	2.0	.2	34.8	25.1	11.6	1.5	38.6	8.8	.17	PHOSPHATE FILT. 0
59	41 334	81 452	E6604	28	14.0	24.0	265	8.58	1.72	8.6	-1.0	.5	.3	34.8	25.2	11.3	1.3	37.9	8.3	.15	PHOSPHATE FILT. 0
60	41 528	81 460	E6604	33	.0	23.0	265	8.34	1.91	-1.0	-1.0	1.7	-1.0	36.5	25.5	11.1	1.3	37.1	9.3	.14	PHOSPHATE FILT. 0
61	42 176	81 476	E6604	38	.0	22.0	262	8.50	1.38	-1.0	-1.0	2.0	-1.0	32.7	25.0	11.1	1.5	36.9	9.0	.17	PHOSPHATE FILT. 0
62	41 533	81 5	E6604	50	.0	22.0	272	8.37	1.87	-1.0	-1.0	3.6	-1.0	37.2	24.4	11.6	1.5	39.2	9.5	.16	PHOSPHATE FILT. 0
63	41 533	81 5	E6604	50	14.0	22.0	267	8.47	1.82	-1.0	-1.0	3.7	-1.0	36.6	25.2	12.0	1.6	39.2	9.8	.17	PHOSPHATE FILT. 0
64	42 63	80 185	E6604	66	.0	22.0	269	8.31	2.10	-1.0	-1.0	2.5	-1.0	36.9	24.9	11.5	1.4	37.9	8.8	.14	PHOSPHATE FILT. 0
65	42 168	80 91	E6604	67	.0	23.0	-1	8.37	2.14	-1.0	-1.0	1.5	-1.0	35.1	23.9	11.5	1.7	37.4	8.8	.14	PHOSPHATE FILT. 0
66	42 326	80 24	E6604	99	.0	21.0	-1	8.23	1.37	-1.0	-1.0	3.0	-1.0	34.9	26.1	11.2	1.7	37.5	9.5	.22	PHOSPHATE FILT. 0
67	42 418	80 37	E6604	73	19.7	5.0	-1	7.62	1.32	9.1	-1.0	15.0	-1.0	-1.0	26.3	11.2	1.7	37.5	8.7	.32	PHOSPHATE FILT. 0
68	42 418	80 37	E6604	73	-.0	-1.0	-1	7.24	3.36	-1.0	-1.0	110.0	-1.0	-1.0	-1.0	12.3	1.9	51.6	8.4	-1.00	PHOS FILT.0.45MU

WHEN NOTE=1, IONIC STRENGTH CALCULATED FROM CONDUCTIVITY. =2, IONIC STRENGTH ASSUMED ZERO. =3, IONIC STRENGTH GREATER THAN .005.
WHEN A SATURATION IS NEGATIVE, UNDERSATURATION OCCURS. WHEN POSITIVE, SUPERSATURATION./

E-66-06 PTC DAUPHINE 11/14/66 SAMPLES NORMALLY NOT FILTERED DEPTH-TEMP G

I	LAT --DEG,	LONG MIN*10.--	CRUIS	ST	DEPTH M	TEMP C	CON MUMHO	PH	ALK MEQ/L	O2 PPM	PS	PHOS PPB(P)	SIO2 PPM	CL PPM	SO4 PPM	NA PPM	K PPM	CA PPM	MG PPM	F PPM	STATION COMMENT
1	42 493	79 194	E6606	1	.0	8.5	-1	8.17	1.99	-1.0	-1.0	10.0	.5	-1.0	-1.0	11.2	1.3	38.9	9.4	-1.00	
2	42 446	79 27	E6606	4	14.0	9.7	-1	8.90	2.02	-1.0	-1.0	7.0	.3	-1.0	-1.0	11.3	1.3	38.6	10.0	.75	
3	42 360	79 114	E6606	6	.0	9.9	-1	8.65	1.68	-1.0	-1.0	10.5	.4	-1.0	-1.0	12.5	1.4	39.3	9.2	.96	
4	42 318	79 205	E6606	7	.0	9.9	-1	8.44	2.07	-1.0	-1.0	10.0	.4	-1.0	-1.0	12.7	1.4	39.5	8.6	.13	
5	42 364	79 381	E6606	10	45.0	10.0	-1	8.19	2.03	-1.0	-1.0	7.0	-1.0	-1.0	-1.0	12.0	1.3	39.1	9.2	-1.00	
6	42 415	79 418	E6606	11	.0	9.5	-1	8.36	1.82	-1.0	-1.0	10.0	-1.0	-1.0	-1.0	11.3	1.4	40.3	8.6	-1.00	
7	42 470	79 360	E6606	12	.0	9.0	-1	8.37	1.85	-1.0	-1.0	9.0	-1.0	30.1	28.5	11.0	1.3	39.1	9.2	.38	
8	42 466	80 41	E6606	15	.0	8.2	-1	8.23	2.17	10.2	-1.0	11.0	-1.0	35.1	24.8	11.1	1.3	38.7	7.0	.17	
9	42 313	80 18	E6606	19	.0	8.2	266	8.03	2.05	9.0	-1.0	10.0	.5	26.9	26.3	10.9	1.3	39.5	8.9	.14	
10	42 373	80 18	E6606	19	54.0	8.0	258	8.18	2.27	11.2	-1.0	22.0	-1.0	26.8	26.2	11.0	1.3	40.6	8.1	.17	
11	42 219	79 548	E6606	21	.0	8.0	-1	8.40	2.00	-1.0	-1.0	9.0	.0	27.4	25.3	10.9	1.3	39.3	8.8	.15	
12	42 219	79 548	E6606	21	35.0	8.0	-1	8.27	2.01	-1.0	-1.0	-1.0	.6	28.9	26.5	11.1	1.2	36.5	10.7	.13	
13	42 187	80 92	E6606	23	.0	9.2	281	8.22	2.18	9.2	-1.0	9.5	.4	27.0	25.0	11.3	1.2	39.7	8.5	.16	
14	42 62	80 160	E6606	24	.0	8.2	275	8.17	1.94	10.2	-1.0	17.5	.4	31.1	26.9	11.6	1.3	38.6	8.9	.16	
15	42 209	80 237	E6606	27	.0	8.5	275	8.36	1.98	9.9	-1.0	7.0	.5	27.4	25.4	11.0	1.3	39.6	8.8	.14	
16	42 304	80 286	E6606	29	.0	8.6	-1	8.26	2.03	9.5	-1.0	8.0	-1.0	34.7	24.0	10.9	1.2	38.8	8.6	.18	
17	42 307	80 421	E6606	30	.0	8.8	281	8.24	1.89	10.5	-1.0	10.5	.5	33.4	25.0	10.9	1.3	36.8	10.0	.18	
18	42 307	80 421	E6606	30	18.0	8.5	268	7.89	1.89	9.9	-1.0	8.5	.4	37.5	24.3	10.8	1.3	37.9	9.1	.12	
19	42 307	80 421	E6606	30	18.0	8.5	268	8.16	1.89	9.9	-1.0	5.5	.3	51.4	25.6	10.8	1.3	37.9	9.1	.16	ENTIRE SAMPLE FIL
20	42 202	80 517	E6606	34	.0	9.4	-1	8.32	2.01	-1.0	-1.0	10.0	.5	37.0	24.3	10.9	1.2	38.5	8.8	.12	
21	42 202	80 517	E6606	34	22.0	9.2	-1	8.23	2.00	-1.0	-1.0	11.0	.5	29.1	24.3	10.8	1.2	38.6	8.8	.16	
22	41 597	80 415	E6606	38	.0	9.0	-1	8.17	1.82	-1.0	-1.0	9.5	.6	28.7	24.8	10.8	1.2	35.7	9.5	.16	
23	41 562	80 558	E6606	39	.0	9.7	-1	7.85	1.89	-1.0	-1.0	8.5	-1.0	37.0	25.6	10.9	1.2	39.0	8.9	.14	
24	41 531	81 6	E6606	40	.0	9.9	-1	8.05	1.78	-1.0	-1.0	17.5	.7	33.9	25.6	12.9	1.3	38.6	8.6	.13	
25	41 531	81 6	E6606	40	10.0	9.8	-1	8.08	1.80	-1.0	-1.0	19.0	.6	44.3	24.3	12.7	1.3	38.0	8.6	.15	
26	41 524	81 63	E6606	41	.0	10.0	-1	8.13	1.89	-1.0	-1.0	9.0	.5	-1.0	-1.0	11.9	1.3	36.9	10.0	-1.00	
27	42 95	81 155	E6606	44	.0	10.1	-1	8.23	1.82	-1.0	-1.0	10.0	.4	-1.0	-1.0	11.2	1.2	38.2	9.0	.25	
28	42 165	81 135	E6606	45	.0	11.0	-1	8.30	1.75	-1.0	-1.0	13.0	.5	37.9	26.3	11.5	1.3	40.4	7.8	.18	
29	42 165	81 135	E6606	45	20.0	13.0	-1	8.18	1.78	-1.0	-1.0	12.0	.4	38.5	26.2	11.5	1.3	39.0	8.5	.13	
30	42 351	81 237	E6606	49	.0	9.0	-1	8.29	2.05	-1.0	-1.0	8.0	.4	26.2	24.3	10.6	1.2	37.9	8.7	.15	
31	42 178	81 472	E6606	52	.0	8.2	269	8.24	1.94	10.3	-1.0	8.0	.5	33.0	23.0	10.5	1.2	36.9	8.5	.19	
32	42 178	81 472	E6606	52	20.0	8.2	-1	8.24	1.94	-1.0	-1.0	-1.0	.5	32.6	-1.0	10.4	1.2	36.8	8.8	-1.00	
33	41 527	81 457	E6606	57	.0	9.0	-1	8.16	1.95	-1.0	-1.0	10.5	.4	34.7	24.8	10.8	1.2	37.2	9.4	.17	
34	41 527	81 457	E6606	57	22.0	9.5	-1	8.10	1.95	-1.0	-1.0	11.0	.4	26.7	23.7	10.8	1.3	38.1	8.8	.14	
35	41 332	81 452	E6606	62	.0	9.5	-1	8.18	1.82	-1.0	-1.0	7.0	.5	26.7	23.7	10.8	1.2	38.1	8.5	.15	
36	41 427	81 543	E6606	65	.0	9.9	275	8.06	2.14	10.2	-1.0	10.0	.4	53.3	24.5	11.0	1.3	38.4	8.9	.16	
37	41 427	81 543	E6606	65	22.0	9.7	273	8.22	2.03	9.9	-1.0	-1.0	.4	27.0	25.2	10.9	1.2	38.6	8.5	.15	
38	41 530	82 15	E6606	67	.0	9.4	-1	8.23	1.89	-1.0	-1.0	-1.0	-1.0	36.2	24.6	10.7	1.2	28.0	7.6	.18	
39	41 573	82 45	E6606	68	10.0	9.9	-1	8.23	1.82	-1.0	-1.0	8.0	.4	29.3	24.5	10.9	1.2	38.1	11.1	.17	
40	42 700	82 112	E6606	70	.0	9.9	-1	8.30	1.96	-1.0	-1.0	6.0	-1.0	30.3	24.7	10.7	1.2	37.6	8.6	.15	
41	42 46	82 184	E6606	71	.0	9.2	-1	8.42	1.82	-1.0	-1.0	7.0	.3	33.7	24.6	10.7	1.2	38.2	10.3	.16	
42	41 460	82 238	E6606	74	.0	7.5	-1	8.24	1.78	-1.0	-1.0	10.0	.6	30.1	20.4	9.8	1.1	31.7	6.9	.18	
43	41 400	82 349	E6606	80	.0	6.8	-1	8.34	1.89	-1.0	-1.0	18.5	.7	29.1	22.2	9.7	1.2	33.2	9.0	.17	
44	41 358	82 567	E6606	81	.0	6.8	-1	8.08	1.80	-1.0	-1.0	15.0	-1.0	29.7	24.8	10.3	1.2	33.3	8.8	.16	
45	41 434	82 536	E6606	82	7.0	6.6	-1	8.09	1.78	-1.0	-1.0	31.0	-1.0	27.9	17.7	10.7	1.2	31.2	7.2	.13	
46	41 459	83 8	E6606	83	.0	6.9	231	7.97	1.69	10.3	-1.0	18.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.00	
47	41 485	83 81	E6606	84	.0	6.2	259	8.23	1.78	11.0	-1.0	23.5	.5	29.4	22.8	10.7	1.2	33.2	8.9	.17	
48	41 481	83 150	E6606	85	.0	6.3	-1	8.10	1.85	-1.0	-1.0	20.0	-1.0	31.9	22.8	-1.0	-1.0	33.2	9.4	.14	
49	41 520	83 143	E6606	86	.0	5.8	258	8.29	1.80	11.8	-1.0	29.5	.5	31.9	21.8	10.7	1.2	33.5	8.6	.12	
50	41 539	83 41	E6606	87	.0	6.5	218	8.05	1.68	10.9	-1.0	-1.0	-1.0	21.3	15.7	6.8	.9	29.2	8.1	.16	
51	41 586	83 69	E6606	88	.0	6.6	203	8.06	1.70	10.8	-1.0	15.5	1.8	15.9	17.1	5.2	.8	-1.0	-1.0	.11	
52	41 591	83 2	E6606	89	.0	6.7	263	8.10	1.65	11.0	-1.0	20.0	1.9	28.7	15.7	6.3	.8	28.9	7.2	.14	
53	41 505	82 529	E6606	90	.0	5.9	245	7.95	1.73	11.6	-1.0	16.0	1.9	41.7	18.1	9.4	1.0	30.8	8.0	.12	
54	41 550	82 463	E6606	91	.0	8.0	-1	8.16	1.79	-1.0	-1.0	91.0	1.2	29.7	17.8	9.4	1.0	30.9	8.5	.16	
55	41 459	83 8	E6606	83	.0	6.9	231	7.97	1.69	10.3	-1.0	10.5	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.00	PHOSPHATE FILTER.
56	41 577	82 391	E6606	92	-.0	11.0	-1	7.29	3.76	-1.0	-1.0	-1.0	22.5	-1.0	-1.0	15.8	2.7	43.2	8.2	-1.00	
57	41 577	82 391	E6606	92	-1.8	11.0	-1	7.44	5.18	-1.0	-1.0	-1.0	27.0	-1.0	-1.0	13.8	2.8	55.6	14.6	-1.00	
58	41 577	82 391	E6606	92	-3.0	11.0	-1	7.10	5.46	-1.0	-1.0	-1.0	33.0	-1.0	-1.0	15.8	28.0	55.2	14.6	-1.00	

WHEN NOTE=1, IONIC STRENGTH CALCULATED FROM CONDUCTIVITY. =2, IONIC STRENGTH ASSUMED ZERO. =3, IONIC STRENGTH GREATER THAN .005.
WHEN A SATURATION IS NEGATIVE, UNDERSATURATION OCCURS. WHEN POSITIVE, SUPERSATURATION./

L. ERIE INLAND WATERS CRUISE 67-1-04 STAT NOS NOT SAME PHOS PUMP THERMO

I	LAT --DEG,	LONG MIN*10.--		CRUIS	ST	DEPTH M	TEMP C	CON MUMHO	PH	ALK MEQ/L	O2 PPM	PS	PHOS PPB(P)	SIO2 PPM	CL PPM	SO4 PPM	NA PPM	K PPM	CA PPM	MG PPM	F PPM	STATION COMMENT
1	41 380	82	450	E6704	70	.0	21.0	329	8.21	1.81	7.2	-1.0	16.7	.2	26.9	24.4	11.4	1.3	40.0	6.3	.41	
2	41 380	82	450	E6704	70	3.0	20.5	328	8.28	1.97	7.2	-1.0	21.6	.2	25.1	24.8	11.0	1.3	38.1	5.8	.48	
3	41 494	82	450	E6704	68	.0	21.4	308	8.15	1.74	6.6	-1.0	34.1	1.4	21.9	22.0	10.2	1.8	34.6	10.0	.34	
4	41 494	82	450	E6704	68	9.0	21.2	317	8.04	1.75	6.9	-1.0	32.8	1.6	25.7	21.9	11.0	1.1	34.7	9.7	.27	
5	41 498	82	535	E6704	64	.0	23.0	313	8.20	1.72	7.3	-1.0	31.6	1.5	27.5	20.4	11.8	1.5	33.9	8.3	.36	
6	41 498	82	535	E6704	64	10.1	22.6	334	8.15	1.68	7.6	-1.0	42.9	1.5	30.2	20.5	11.0	1.8	33.1	8.7	.36	
7	41 450	83	48	E6704	62	.0	22.2	276	8.68	1.71	7.2	-1.0	14.8	.5	24.6	19.2	10.7	1.3	35.1	6.3	.36	
8	41 450	83	48	E6704	62	6.0	22.0	269	8.36	1.71	6.3	-1.0	28.3	.5	28.8	18.6	11.0	1.3	31.4	10.0	.31	
9	41 536	83	117	E6704	59	.0	20.7	293	8.14	1.70	7.3	-1.0	43.4	.4	28.2	19.7	10.2	1.4	32.4	8.3	.30	
10	41 536	83	117	E6704	59	7.0	20.5	270	8.04	1.77	6.2	-1.0	34.4	.7	23.4	19.6	9.6	1.9	30.9	8.0	.33	
11	41 553	82	564	E6704	57	.0	20.6	304	8.25	1.64	6.5	-1.0	29.0	.9	24.0	20.3	9.8	1.9	34.8	12.1	.36	
12	41 553	82	564	E6704	57	8.0	20.3	304	8.13	1.82	6.3	-1.0	29.0	.7	25.7	20.2	9.3	1.3	35.9	6.1	.35	
13	41 592	82	363	E6704	54	.0	21.0	308	8.74	1.71	8.1	-1.0	18.9	.8	30.9	20.2	10.7	1.7	34.2	10.9	.43	
14	41 592	82	363	E6704	54	9.0	16.8	256	8.46	1.82	6.8	-1.0	15.8	.8	32.4	19.4	11.2	1.7	34.0	9.2	.42	
15	41 488	82	304	E6704	51	.0	20.8	322	8.17	1.90	7.5	-1.0	13.9	1.1	22.9	23.8	9.3	3.4	35.9	9.5	.37	
16	41 488	82	304	E6704	51	10.5	19.8	312	8.34	1.96	7.2	-1.0	12.3	1.1	30.2	22.6	12.0	1.4	36.0	8.7	.41	
17	41 418	82	270	E6704	49	.0	20.5	333	8.07	1.93	7.3	-1.0	8.9	.7	27.5	24.4	16.6	2.0	36.5	9.5	.43	
18	41 418	82	270	E6704	49	12.5	19.5	316	7.95	1.91	6.7	-1.0	14.0	.8	30.2	24.1	12.6	1.2	37.1	8.7	.36	
19	41 367	82	312	E6704	47	.0	20.2	333	8.04	1.90	7.6	-1.0	11.0	.9	28.8	24.6	13.2	2.6	37.0	8.8	.34	
20	41 367	82	312	E6704	47	12.0	20.2	330	8.03	1.87	7.5	-1.0	15.6	1.5	33.9	24.4	11.2	1.2	36.6	9.7	.32	
21	41 318	82	357	E6704	45	.0	21.1	327	8.23	1.81	6.7	-1.0	10.7	.8	33.9	24.4	12.6	2.2	36.9	9.5	.34	
22	41 318	82	357	E6704	45	12.0	20.8	332	8.18	1.87	8.0	-1.0	8.1	.1	29.5	23.8	13.2	1.1	36.8	8.7	.42	
23	41 259	82	329	E6704	43	.0	21.2	337	8.14	1.90	7.3	-1.0	28.9	.8	31.6	28.8	12.3	1.1	39.5	6.8	.42	
24	41 259	82	329	E6704	43	9.5	20.5	355	8.12	2.17	7.0	-1.0	36.3	1.1	31.6	27.0	12.6	3.5	39.0	9.2	.37	
25	41 312	82	198	E6704	41	.0	20.6	321	8.40	1.90	7.8	-1.0	4.4	.6	35.5	26.3	11.8	1.4	36.9	10.2	.39	
26	41 312	82	198	E6704	41	12.5	20.2	345	8.34	1.88	7.9	-1.0	.4	.4	37.2	26.9	12.9	1.5	37.4	10.9	.36	
27	41 356	82	74	E6704	38	.0	20.5	327	8.32	1.94	8.3	-1.0	3.1	.4	29.9	25.5	13.2	1.2	37.6	10.0	.38	
28	41 356	82	74	E6704	38	15.0	20.0	343	8.29	1.88	8.2	-1.0	5.6	.9	32.4	27.4	14.8	1.4	37.9	9.2	.35	
29	41 346	81	530	E6704	35	.0	18.8	346	8.42	1.91	9.0	-1.0	1.7	.2	31.6	25.6	13.5	.9	37.9	9.0	.40	
30	41 346	81	530	E6704	35	16.0	17.4	346	8.40	1.93	9.1	-1.0	5.0	.3	31.6	25.0	13.5	1.5	37.8	9.2	.38	
31	41 308	81	477	E6704	30	.0	20.2	340	8.15	1.82	8.1	-1.0	20.2	.6	28.8	26.6	13.5	1.9	37.8	9.0	.37	
32	41 308	81	477	E6704	30	12.5	19.8	342	8.15	1.81	8.5	-1.0	19.1	.5	35.5	25.9	14.5	1.9	38.7	11.7	.36	
33	41 373	81	454	E6704	25	.0	18.8	338	8.23	1.87	9.2	-1.0	.4	.3	37.2	25.4	14.5	.0	39.1	12.2	.48	
34	41 373	81	454	E6704	25	17.0	12.5	375	7.89	1.79	5.2	-1.0	6.2	1.0	29.9	27.0	13.8	2.9	40.8	10.7	.34	
35	41 373	81	454	E6704	25	12.0	14.8	372	7.95	1.85	5.8	-1.0	3.3	.2	38.9	26.0	14.5	.2	39.1	9.0	.39	
36	41 320	81	419	E6704	23	.0	19.9	348	8.16	1.90	7.7	-1.0	19.2	.6	32.4	27.8	14.8	1.0	38.2	8.6	.35	
37	41 320	81	419	E6704	23	11.0	19.5	356	8.16	1.85	8.0	-1.0	8.0	.5	35.5	26.2	13.5	2.0	37.8	9.2	.35	
38	41 371	81	378	E6704	18	.0	19.3	348	8.13	1.78	8.7	-1.0	5.1	.3	35.5	26.2	13.5	2.7	38.4	9.0	.45	
39	41 371	81	378	E6704	18	15.0	14.2	372	7.73	1.52	5.3	-1.0	8.6	1.0	40.7	28.2	-1.0	-1.0	39.8	8.5	.37	
40	41 393	81	313	E6704	14	.0	19.8	348	8.03	1.78	8.8	-1.0	11.4	.5	37.2	28.0	14.8	2.0	37.5	9.5	.31	
41	41 393	81	313	E6704	14	13.0	17.0	366	7.93	1.97	6.1	-1.0	20.5	.8	38.9	27.3	17.0	2.2	39.6	9.2	.33	
42	41 450	81	427	E6704	11	.0	19.8	342	8.50	1.86	8.1	-1.0	1.7	.1	30.9	26.0	13.8	1.4	38.8	8.5	.40	
43	41 450	81	427	E6704	11	20.5	12.0	403	7.89	1.97	6.7	-1.0	1.7	.5	31.6	24.8	12.9	1.7	37.2	9.0	.38	
44	41 450	81	427	E6704	11	8.0	19.5	372	8.34	1.90	7.1	-1.0	5.1	.1	33.1	24.6	12.9	3.3	38.1	9.0	.32	
45	41 558	81	495	E6704	10	.0	20.4	330	8.30	1.85	7.2	-1.0	.0	.0	34.7	25.4	14.8	.8	37.8	9.0	.31	
46	41 558	81	495	E6704	10	23.0	12.5	372	7.83	1.90	7.7	-1.0	6.8	.6	31.6	24.4	13.5	.9	38.0	9.2	.32	
47	41 558	81	495	E6704	10	18.0	15.0	343	7.93	1.88	6.8	-1.0	6.4	.3	35.5	24.4	11.0	2.0	38.6	8.8	.34	
48	41 457	81	589	E6704	9	.0	19.9	343	8.39	1.86	6.5	-1.0	3.5	.3	32.4	25.6	13.8	.7	37.2	9.5	.35	
49	41 457	81	589	E6704	9	21.0	11.2	382	7.96	1.96	6.3	-1.0	9.1	.6	29.9	24.6	13.2	2.5	39.5	2.2	.38	
50	41 457	81	589	E6704	9	18.0	11.7	378	7.88	2.02	6.6	-1.0	5.6	.5	35.5	26.0	14.1	2.7	39.2	9.2	.35	
51	41 462	82	150	E6704	8	.0	19.8	334	8.29	1.85	7.8	-1.0	1.1	.7	30.9	24.4	13.2	.0	35.7	9.9	.36	
52	41 462	82	150	E6704	8	17.7	13.6	372	7.78	1.82	5.2	-1.0	22.0	.9	40.7	27.2	14.8	2.3	39.2	9.7	.26	
53	41 570	82	220	E6704	5	.0	20.5	325	8.50	1.89	8.3	-1.0	3.3	.7	31.6	23.8	15.9	1.4	35.8	9.2	.35	
54	41 570	82	220	E6704	5	16.5	13.5	367	7.94	1.95	5.3	-1.0	20.1	1.1	29.9	26.0	15.1	.8	38.4	10.2	.33	
55	42 64	82	130	E6704	3	.0	20.0	334	8.34	1.85	8.2	-1.0	3.1	.2	30.2	25.6	13.2	1.8	37.2	10.7	.37	
56	42 64	82	130	E6704	3	17.0	12.8	367	7.84	1.89	5.0	-1.0	17.8	1.1	34.7	23.6	13.8	.8	37.8	9.0	.32	
57	42 64	82	130	E6704	3	11.5	19.5	340	8.23	1.73	8.2	-1.0	2.4	.2	27.5	24.6	14.1	.1	36.8	9.5	.32	
58	41 571	82	67	E6704	2	.0	20.0	334	8.45	1.75	8.5	-1.0	1.2	.3	32.4	25.0	13.5	.9	33.8	10.4	.35	
59	41 571	82	67	E6704	2	20.5	13.0	391	7.86	1.94	5.8	-1.0	7.2	.9	33.1	25.6	15.1	1.9	39.6	7.8	.33	
60	41 571	82	67	E6704	2	13.0	19.5	340	8.19	1.72	8.5	-1.0	1.9	.2	33.9	26.0	14.5	1.1	36.8	9.0	.31	
61	42 62	81	571	E6704	1	.0	20.0	332	8.38	1.78	8.1	-1.0	-1.0	.1	33.1	20.0	13.8	2.8	36.3	7.3	.36	
62	42 62	81	571	E6704	1	19.0	12.8	361	7.74	1.83	5.4	-1.0	-1.0	.7	32.4	24.5	13.4	1.3	37.2	9.0	.31	
63	42 62	81	571	E6704	1	17.0	19.4	335	8.27	1.83	8.3	-1.0	-1.0	.3	35.5	24.2	13.8	2.3	37.2	8.0	.26	
64	42 57	81	410	E6704	98	.0	22.0	333	8.33	1.90	6.5	-1.0	-1.0	.4	30.2	28.4	14.1	1.0	37.7	10.2	.37	
65	42 57	81	410	E6704	98	24.0	12.7	378	7.51	1.85	6.0	-1.0	-1.0	.7	37.2	26.4	13.0	1.1	37.8	8.3	.30	
66	42 57	81	410	E6704	98	15.0	19.1	321	7.91	1.88	8.3	-1.0	-1.0	.2	29.5	24.2	12.3	1.3	37.1	11.1	.31	
67	42 154	81	320	E6704	97	.0	22.2	325	8.48	1.87	7.9	-1.0	-1.0	.2	34.7	24.4	13.2	1.7	35.4	10.0	.36	
68	42 154	81	320	E6704	97	15.0	13.5	386	7.56	1.81	6.4	-1.0	-1.0	.6	36.3	25.0	15.5	.9	38.0	9.0	.26	
69	42 154	81	320	E6704	97	7.5	20.0	330	8.29	1.82	7.7	-1.0	-1.0	.3	30.9	23.8	13.5	2.2	37.4	9.2	.31	
70	42 167	81	485	E6704	96	.0	22.4	320	8.47	1.86	8.3	-1.0	-1.0	.6	28.8	24.2	12.9	1.9	36.9	9.7	.35	
71	42 167	81	485	E6704	96	15.0	14.0	362	7.56	1.97	5.2	-1.0	-1.0	.7	31.6	24.9	13.8	1.3	37.8	9.0	.34	
72	42 167	81	485	E6704	96	6.0	21.0	328	8.18	1.84	8.1	-1.0	-1.0	.6	32.4	23.8	14.5	.4	33.8	5.6	.38	
73	42 28	81	248	E6704	89	.0	20.2	327	8.30	1.99	8.6	-1.0	-1.0	.1	33.9	24.0	13.2	1.9	37.6	9.0	.51	
74	42 28	81	248	E6704	89	23.0	11.5	361	7.49	1.90	7.8	-1.0	-1.0	.5	35.5	25.8	13.5	1.0	38.6	9.7	.31	
75	42 28	81	248	E6704	89	14.0	19.0	332	8.10	1.91	8.5	-1.0	-1.0	.0	32.4	25.0	13.8	2.3	34.8	10.5	.36	
76	41 553	81	332	E6704	88	.0	19.8	341	8.28	1.85	8.8	-1.0	-1.0	.2	32.4	24.6	13.2	3.0	39.1	8.5	.39	
77	41 553	81	332	E6704	88	24.0	11.0	358	7.52	1.93	7.6	-1.0	-1.0	.6	31.6	24.8	14.1	1.8	38.2	8.5	.36	
78	41 553	81	332	E6704	88	13.0	18.5	338	8.08	1.85	9.2	-1.0	-1.0	.0	36.3	24.8	15.1	.7	39.2	9.0	.37	
79	41 488	81	221	E6704	87	.0	20.2	348	8.13	1.85	8.7	-1.0	-1.0	.5	34.7	27.0	16.2	1.9	39.1	9.3	.37	
80	41 488	81	221	E6704	87	18.0	12.0	391	7.65	1.91	6.3	-1.0	-1.0	.9	37.2	24.3	15.5	1.9	38.8	7.0	.30	
81	41 488	81	221	E6704	87	14.0	17.5	346	7.72	1.74	8.8	-1.0	-1.0	.1	38.9	26.0	14.8	2.2	39.5	9.2	.28	
82	41 570	82	220	E6704	5	8.0	20.2	323	8.33	1.74	8.0	-1.0	2.8	.7	26.9	23.2	12.6	1.3	38.6	10.0	.33	
83	41 380	82	450	E6704	70	.0	21.0	329	8.21	1.81	7.2	-1.0	20.3	.2	26.9	24.4	11.4	1.3	40.0	6.3	.41	PLANKTON NET FILT
84	41 380	82	450	E6704	70	3.0	20.5	328	8.28	1.97	7.2	-1.0	19.0	.2	25.1	24.8	11.0	1.3	38.1	5.8	.48	PLANKTON NET FILT
85	41 494	82	450	E6704	68	.0	21.4	308	8.15	1.74	6.6	-1.0	36.3	1.4	21.9	22.0	10.2	1.8	34.6	10.0	.34	PLANKTON NET FILT
86	41 494	82	450	E6704	68	9.0	21.2	317	8.04	1.75	6.9	-1.0	35.1	1.6	25.7	21.9	11.0	1.1	34.7	9.7	.27	PLANKTON NET FILT
87	41 592	82	363	E6704	54	.0	21.0	308	8.74	1.71	8.1	-1.0	13.2	.9	30.9	20.2	10.7	1.7	34.2	10.9	.43	PLANKTON NET FILT
88	41 592	82	363	E6704	54	9.0	16.8	274	8.46	1.82	6.8	-1.0	16.2	.8	32.4	19.4	11.2	1.7	34.0	9.2	.42	PLANKTON NET FILT
89	41 418	82	270	E6704	49	.0	20.5	333	8.07	1.93	7.3	-1.0	8.9	.7	27.5	24.4	16.6	2.0	36.5	9.5	.43	PLANKTON NET FILT
90	41 418	82	270	E6704	49	12.5	19.5	316	7.95	1.91	6.7	-1.0	15.9	.8	30.2	24.1	12.6	1.2	37.1	8.7	.36	PLANKTON NET FILT
91	41 367	82	312	E6704	47	.0	20.2	333	8.04	1.90	7.6	-1.0	7.8	.9	28.8	24.6	13.2	2.6	37.0	8.8	.34	PLANKTON NET FILT
92	41 367	82	312	E6704	47	12.0	20.2	330	8.03	1.87	7.5	-1.0	17.3	1.5	33.9	24.4	11.2	1.2	36.6	9.7	.32	PLANKTON NET FILT
93	41 318	82	357	E6704	45	.0	21.1	327	8.23	1.81	6.7	-1.0	7.4	.8	33.9	24.4	12.6	2.2	36.9	9.5	.34	PLANKTON NET FILT
94	41 318	82	357	E6704	45	12.0	20.8	332	8.18	1.87	8.0	-1.0	11.9	.1	29.5	23.8	13.2	1.1	36.8	8.7	.42	PLANKTON NET FILT

I	LAT		LONG		CRUIS	ST	DEPTH	TEMP	CCN	PH	ALK	O2	PS	PHOS	SIO2	CL	SO4	NA	K	CA	MG	F	STATION COMMENT
	--DEG, MIN*10.--						M	C	MUMHO		MEQ/L	PPM		PPB(P)	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	
95	41	259	82	329	E6704	43	.0	21.2	337	8.14	1.90	7.3	-1.0	29.3	.8	31.6	28.8	12.3	1.1	39.5	6.8	.42	PLANKTON NET FILT
96	41	259	82	329	E6704	43	9.5	20.5	355	8.12	2.17	7.0	-1.0	33.0	1.1	31.6	27.0	12.6	3.5	39.0	9.2	.37	PLANKTON NET FILT
97	41	312	82	198	E6704	41	.0	20.6	321	8.40	1.90	7.8	-1.0	3.7	.6	35.5	26.3	11.8	1.4	36.9	10.2	.39	PLANKTON NET FILT
98	41	312	82	198	E6704	41	12.5	20.2	345	8.34	1.88	7.9	-1.0	1.3	.4	37.2	26.9	12.9	1.5	37.4	10.9	.36	PLANKTON NET FILT
99	41	356	82	74	E6704	38	15.0	20.0	343	8.29	1.88	8.2	-1.0	18.3	.9	32.4	27.4	14.8	1.4	37.9	9.2	.35	PLANKTON NET FILT
100	41	346	81	530	E6704	35	.0	18.8	346	8.42	1.91	9.0	-1.0	3.4	.2	31.6	25.6	13.5	1.4	37.9	9.0	.40	PLANKTON NET FILT
101	41	346	81	530	E6704	35	16.0	17.4	346	8.40	1.93	9.1	-1.0	1.5	.3	31.6	25.0	13.5	1.5	37.8	9.2	.38	PLANKTON NET FILT
102	41	308	81	877	E6704	30	.0	20.2	340	8.15	1.82	8.1	-1.0	15.6	.6	28.8	26.6	13.5	1.9	37.8	9.0	.37	PLANKTON NET FILT
103	41	308	81	877	E6704	30	12.5	19.8	342	8.15	1.81	8.5	-1.0	14.8	.5	35.5	25.9	14.5	1.9	38.7	11.7	.36	PLANKTON NET FILT
104	41	373	81	454	E6704	25	.0	18.8	338	8.23	1.87	9.2	-1.0	68.1	.3	37.2	25.4	14.5	.0	39.1	12.2	.48	PLANKTON NET FILT
105	41	373	81	454	E6704	25	17.0	12.5	375	7.89	1.79	5.2	-1.0	5.1	1.0	29.9	27.0	13.8	2.9	40.8	10.7	.34	PLANKTON NET FILT
106	41	373	81	454	E6704	25	12.0	14.8	372	7.95	1.85	5.8	-1.0	.0	.2	38.9	26.0	14.5	.2	39.1	9.0	.39	PLANKTON NET FILT
107	41	320	81	419	E6704	23	.0	19.9	348	8.16	1.90	7.7	-1.0	22.5	.6	32.4	27.8	14.8	1.0	38.2	8.6	.35	PLANKTON NET FILT
108	41	320	81	419	E6704	23	11.0	19.5	356	8.16	1.85	8.0	-1.0	19.4	.5	35.5	26.2	13.5	2.0	37.8	9.1	.35	PLANKTON NET FILT
109	41	380	82	450	E6704	70	.0	21.0	329	8.21	1.81	7.2	-1.0	14.8	.2	26.9	24.4	11.4	1.3	40.0	6.3	.41	PLANK + .45MIC FI
110	41	494	82	450	E6704	68	.0	21.4	308	8.15	1.74	6.6	-1.0	29.3	1.4	21.9	22.0	10.2	1.8	34.6	10.0	.34	PLANK + .45MIC FI
111	41	494	82	450	E6704	68	9.0	21.2	317	8.04	1.75	6.9	-1.0	72.5	1.6	25.7	21.9	11.0	1.1	34.7	9.7	2.70	PLANK + .45MIC FI
112	81	498	82	535	E6704	64	.0	23.0	313	8.20	1.72	7.3	-1.0	40.0	1.5	27.5	20.4	11.8	1.5	33.9	8.3	.36	PLANK + .45MIC FI
113	81	498	82	535	E6704	64	10.1	22.6	334	8.15	1.68	7.6	-1.0	43.8	1.5	30.2	20.5	11.0	1.8	33.1	8.7	.36	PLANK + .45MIC FI
114	41	450	83	48	E6704	62	.0	22.2	276	8.68	1.71	7.2	-1.0	11.1	.5	24.6	19.2	10.7	1.3	35.1	6.3	.36	PLANK + .45MIC FI
115	41	450	83	48	E6704	62	6.0	22.0	269	8.36	1.71	6.3	-1.0	9.8	.5	28.8	18.6	11.0	1.3	31.4	10.0	.31	PLANK + .45MIC FI
116	41	536	83	117	E6704	59	.0	20.7	293	8.14	1.70	7.3	-1.0	36.3	.4	28.2	19.7	10.2	1.4	32.4	8.3	.30	PLANK + .45MIC FI
117	41	536	83	117	E6704	59	7.0	20.5	270	8.04	1.77	6.2	-1.0	28.0	.7	23.4	19.6	9.6	1.9	30.9	8.0	.33	PLANK +.45MIC FIL
118	41	553	82	564	E6704	57	.0	20.6	304	8.25	1.64	6.5	-1.0	27.4	.9	24.0	20.3	9.8	1.9	34.8	12.1	.36	PLANK + .45MIC FI
119	41	553	82	564	E6704	57	8.0	20.3	304	8.13	1.82	6.3	-1.0	26.7	.7	25.7	20.2	9.3	1.3	35.9	6.1	.35	PLANK + .45MIC FI
120	41	592	82	363	E6704	54	.0	21.0	308	8.74	1.71	8.1	-1.0	4.9	.8	30.9	20.2	10.7	1.7	34.2	10.9	.43	PLANK + .45MIC FI
121	41	592	82	363	E6704	54	9.0	16.8	256	8.46	1.82	6.8	-1.0	7.2	.8	32.4	19.4	11.2	1.7	34.0	9.2	.42	PLANK + .45MIC FI
122	61	488	82	304	E6704	51	.0	20.8	322	8.17	1.90	7.5	-1.0	12.3	1.1	22.9	23.8	9.3	3.4	35.9	9.5	.37	PLANK + .45MIC FI
123	61	488	82	304	E6704	51	10.5	19.8	312	8.34	1.96	7.2	-1.0	9.9	1.1	30.2	22.6	12.0	1.4	36.0	8.7	.41	PLANK + .45MIC FI
124	41	418	82	270	E6704	49	.0	20.5	333	8.07	1.93	7.3	-1.0	11.0	.7	27.5	24.4	16.6	2.0	36.5	9.5	.43	PLANK + .45MIC FI
125	41	418	82	270	E6704	49	12.5	19.5	316	7.95	1.91	6.7	-1.0	26.6	.8	30.2	24.1	12.6	1.2	37.1	8.7	.36	PLANK + .45MIC FI
126	41	367	82	312	E6704	47	.0	20.2	333	8.04	1.90	7.6	-1.0	11.9	.9	28.8	24.6	13.2	2.6	37.0	8.8	.34	PLANK + .45MIC FI
127	41	367	82	312	E6704	47	12.0	20.2	330	8.03	1.87	7.5	-1.0	7.8	1.5	33.9	24.4	11.2	1.2	36.6	9.7	.32	PLANK + .45MIC FI
128	41	318	82	357	E6704	45	.0	21.1	327	8.23	1.81	6.7	-1.0	6.7	.8	33.9	24.4	12.6	2.2	36.9	9.5	.34	PLANK + .45MIC FI
129	41	318	82	357	E6704	45	12.0	20.8	332	8.18	1.87	8.0	-1.0	6.0	.1	29.5	23.8	13.2	1.1	36.8	8.7	.42	PLANK + .45MIC FI
130	41	259	82	329	E6704	43	.0	21.2	337	8.14	1.90	7.3	-1.0	24.1	.8	31.6	28.8	12.3	1.1	39.5	6.8	.42	PLANK + .45MIC FI
131	41	259	82	329	E6704	43	9.5	20.5	355	8.12	2.17	7.0	-1.0	26.3	1.1	31.6	27.0	12.6	3.5	39.0	9.2	.37	PLANK + .45MIC FI
132	41	312	82	198	E6704	41	.0	20.6	321	8.40	1.90	7.8	-1.0	2.6	.6	35.5	26.3	11.8	1.4	36.9	10.2	.39	PLANK + .45MIC FI
133	41	312	82	198	E6704	41	12.5	20.2	345	8.34	1.88	7.9	-1.0	.9	.4	37.2	26.9	12.9	1.5	37.4	10.9	.36	PLANK + .45MIC FI
134	41	356	82	74	E6704	38	.0	20.5	327	8.32	1.94	8.3	-1.0	3.1	.4	29.9	25.5	13.2	1.2	37.6	10.0	.38	PLANK + .45MIC FI
135	41	356	82	74	E6704	38	15.0	20.0	343	8.29	1.88	8.2	-1.0	14.1	.9	-.0	27.4	14.8	1.4	37.9	9.2	.35	PLANK + .45MIC FI
136	41	346	81	530	E6704	35	.0	18.8	346	8.42	1.91	9.0	-1.0	17.5	.2	31.6	25.6	13.5	-.0	37.9	9.0	.40	PLANK +.45MIC FIL
137	41	346	81	530	E6704	35	16.0	17.4	346	8.40	1.93	9.1	-1.0	2.7	.3	31.6	25.0	13.5	1.5	37.8	9.2	.38	PLANK + .45MIC FI
138	41	308	81	877	E6704	30	.0	20.2	340	8.15	1.82	8.1	-1.0	15.2	.6	28.8	26.6	13.5	1.9	37.8	9.0	.37	PLANK +.45MIC FIL
139	41	308	81	877	E6704	30	12.5	19.8	342	8.15	1.81	8.5	-1.0	11.9	.5	35.5	25.9	14.5	1.9	38.7	11.7	.36	PLANK + .45MIC FI
140	41	373	81	454	E6704	25	.0	18.8	338	8.23	1.87	9.2	-1.0	.4	.3	37.2	25.4	14.5	.0	39.1	12.2	.48	PLANK + .45MIC FI
141	41	373	81	454	E6704	25	17.0	12.5	375	7.89	1.79	5.2	-1.0	13.0	1.0	29.9	27.0	13.8	2.9	40.8	10.7	.34	PLANK + .45MIC FI
142	41	373	81	454	E6704	25	12.0	14.8	372	7.95	1.85	5.8	-1.0	7.3	.2	38.9	26.0	14.5	.2	39.1	9.0	.39	PLANK +.45MIC FIL
143	41	320	81	419	E6704	23	.0	19.9	348	8.16	1.90	7.7	-1.0	14.3	.6	32.4	27.8	14.8	1.0	38.2	8.6	.35	PLANK + .45MIC FI
144	41	320	81	419	E6704	23	11.0	19.5	356	8.16	1.85	8.0	-1.0	14.0	.5	35.5	26.2	13.5	2.0	37.8	9.1	.35	PLANK + .45MIC FI
145	41	371	81	378	E6704	18	.0	19.3	348	8.13	1.78	8.7	-1.0	.4	.3	35.5	26.2	13.5	2.7	38.4	9.0	.45	PLANK + .45MIC FI

WHEN NOTE=1, IONIC STRENGTH CALCULATED FROM CONDUCTIVITY. =2, IONIC STRENGTH ASSUMED ZERO. =3, IONIC STRENGTH GREATER THAN .005.
WHEN A SATURATION IS NEGATIVE, UNDERSATURATION OCCURS. WHEN POSITIVE, SUPERSATURATION./

L ONTARIO 065-11 11/29/65 SYNOPTIC PTE DAUPHINE

I	LAT --DEG,	LONG MIN*10.--	CRUIS	ST	DEPTH M	TEMP C	CON MUMHO	PH	ALK MEQ/L	O2 PPM	PS	PHOS PPB(P)	SIO2 PPM	CL PPM	SO4 PPM	NA PPM	K PPM	CA PPM	MG PPM	F PPM	STATION COMMENT
1	43 225	77 330	06511	8	.0	11.0	284	7.68	1.78	-1.0	-1.0	7.7	.0	24.0	20.0	11.3	-1.0	38.2	9.3	.11	
2	43 225	77 330	06511	8	77.0	7.0	281	5.25	1.20	-1.0	-1.0	20.1	.0	27.0	26.0	11.6	-1.0	39.0	9.2	.10	
3	43 336	77 350	06511	10	.0	11.0	280	7.83	1.42	-1.0	-1.0	8.4	.0	23.5	-1.0	11.5	-1.0	39.2	8.8	.13	
4	43 336	77 350	06511	10	166.0	11.0	283	7.69	1.63	-1.0	-1.0	16.3	.4	24.0	21.0	11.5	-1.0	40.2	8.4	.12	
5	43 450	77 363	06511	12	.0	7.0	282	7.92	1.59	-1.0	-1.0	11.8	.2	24.0	16.0	11.2	-1.0	39.3	8.9	.12	
6	43 450	77 363	06511	12	66.0	7.0	280	7.88	1.59	-1.0	-1.0	12.9	.3	25.0	16.0	11.0	-1.0	39.5	8.7	.12	
7	43 565	77 368	06511	14	.0	7.0	282	7.94	1.63	-1.0	-1.0	8.4	.3	25.0	21.0	11.7	-1.0	40.2	8.6	.13	
8	43 565	77 368	06511	14	20.0	6.0	276	7.87	1.63	-1.0	-1.0	8.2	.4	25.0	-1.0	11.4	-1.0	38.8	9.2	.13	
9	43 479	77 86	06511	15	.0	8.0	284	7.96	2.09	-1.0	-1.0	7.3	.0	23.5	13.0	11.4	-1.0	39.3	8.8	.11	
10	43 479	77 86	06511	15	34.0	10.0	278	7.98	1.75	-1.0	-1.0	8.1	.0	23.0	9.0	11.4	-1.0	39.7	8.7	.13	
11	43 386	77 89	06511	17	.0	11.0	282	7.97	1.86	-1.0	-1.0	8.8	.0	25.0	16.0	11.2	-1.0	39.4	8.5	.11	
12	43 386	77 89	06511	17	115.0	11.0	276	7.86	1.86	-1.0	-1.0	8.2	.1	24.0	20.0	11.2	-1.0	38.8	8.8	.12	
13	43 286	77 84	06511	19	.0	9.5	281	7.94	1.65	-1.0	-1.0	9.3	.1	27.0	17.0	11.5	-1.0	39.5	8.6	.13	
14	43 286	77 84	06511	19	225.0	8.0	288	7.69	1.71	-1.0	-1.0	17.2	.5	25.0	15.0	11.1	-1.0	39.8	8.8	.13	
15	43 195	77 81	06511	21	.0	7.5	285	8.02	1.59	-1.0	-1.0	7.7	.0	25.0	27.0	12.0	-1.0	34.8	8.7	.12	
16	43 257	76 396	06511	22	.0	8.7	279	7.89	1.67	-1.0	-1.0	7.7	.0	27.0	17.0	11.6	-1.0	39.8	8.8	.13	
17	43 257	76 396	06511	22	20.0	7.0	279	7.92	1.57	-1.0	-1.0	10.2	.0	28.0	17.0	11.3	-1.0	40.0	8.6	.12	
18	43 353	76 411	06511	24	.0	8.5	278	8.00	1.63	-1.0	-1.0	9.4	.0	26.0	20.0	11.4	-1.0	39.5	8.5	.14	
19	43 353	76 411	06511	24	197.0	6.0	285	7.82	1.61	-1.0	-1.0	18.0	1.0	23.5	22.0	11.0	-1.0	40.4	8.8	.11	
20	43 445	76 421	06511	26	.0	8.0	282	8.02	1.67	-1.0	-1.0	5.3	.0	27.5	20.0	11.4	-1.0	-1.0	-1.0	.11	
21	43 445	76 421	06511	26	89.0	8.0	276	7.96	1.69	-1.0	-1.0	8.5	.3	25.0	12.0	11.5	-1.0	39.4	8.1	.12	
22	43 540	76 441	06511	28	.0	9.0	282	8.00	1.47	-1.0	-1.0	6.7	.0	26.0	46.0	11.6	-1.0	39.7	8.8	.12	
23	43 540	76 441	06511	28	21.0	7.5	278	8.01	1.88	-1.0	-1.0	5.3	.3	25.5	-1.0	12.2	-1.0	40.0	8.3	.13	
24	43 495	76 230	06511	29	.0	8.0	282	7.89	1.67	-1.0	-1.0	7.0	.0	24.0	18.0	11.4	-1.0	39.2	8.4	.13	
25	43 495	76 230	06511	29	27.0	8.5	277	7.95	1.56	-1.0	-1.0	6.2	.2	27.0	12.0	11.8	-1.0	39.8	8.2	.12	
26	43 386	76 227	06511	31	.0	8.5	289	7.83	1.87	-1.0	-1.0	6.7	.0	26.0	14.0	11.0	-1.0	40.1	8.4	.13	
27	43 386	76 227	06511	31	75.0	8.0	280	7.85	1.85	-1.0	-1.0	8.4	.1	25.0	-1.0	11.4	-1.0	39.8	8.8	.13	

WHEN NOTE=1, IONIC STRENGTH CALCULATED FROM CONDUCTIVITY. =2, IONIC STRENGTH ASSUMED ZERO. =3, IONIC STRENGTH GREATER THAN .005.
WHEN A SATURATION IS NEGATIVE, UNDERSATURATION OCCURS. WHEN POSITIVE, SUPERSATURATION./

L ONTARIO 066-01 1/23/66 SYNOPTIC + CORE PTE DAUPHINE

I	LAT --DEG,	LONG MIN*10.--	CRUIS	ST	DEPTH M	TEMP C	CON MUMHO	PH	ALK MEQ/L	O2 PPM	PS	PHOS PPB(P)	SIO2 PPM	CL PPM	SO4 PPM	NA PPM	K PPM	CA PPM	MG PPM	F PPM	STATION COMMENT
1	43 354	79 280	06601	1	.0	2.0	277	7.10	1.94	-1.0	-1.0	-1.0	-1.0	-1.0	21.0	11.4	1.3	40.8	7.8	.11	
2	43 354	79 280	06601	1	33.0	2.0	275	7.35	1.43	-1.0	-1.0	-1.0	-1.0	-1.0	28.0	11.2	1.2	41.1	8.2	.14	
3	43 313	79 253	06601	2	.0	3.4	277	8.04	1.51	-1.0	-1.0	12.6	.3	-1.0	17.0	11.4	1.3	40.4	7.9	.14	
4	43 313	79 253	06601	2	77.0	3.1	277	8.12	1.62	-1.0	-1.0	13.1	.3	-1.0	22.0	11.1	1.3	39.9	8.2	.16	
5	43 274	79 227	06601	3	.0	4.0	272	8.05	1.95	-1.0	-1.0	13.0	.3	24.5	18.0	11.0	1.6	40.5	7.9	.15	
6	43 274	79 227	06601	3	104.0	3.7	275	8.15	1.62	-1.0	-1.0	12.7	.3	16.5	20.0	11.0	1.3	40.1	8.0	.13	
7	43 235	79 341	06601	4	.0	2.9	275	7.90	1.73	-1.0	-1.0	11.9	.3	17.0	18.0	11.1	1.4	40.5	7.9	.15	
8	43 235	79 341	06601	4	77.0	3.1	274	7.93	1.74	-1.0	-1.0	11.6	.4	24.0	23.0	10.9	1.3	41.0	7.5	.12	
9	43 179	79 301	06601	5	.0	3.0	271	7.96	1.96	-1.0	-1.0	-1.0	-1.0	16.5	19.0	11.0	1.4	40.2	7.8	.11	
10	43 179	79 301	06601	5	78.0	3.1	-1	7.90	-1.00	-1.0	-1.0	-1.0	-1.0	-1.0	18.0	11.0	1.4	43.5	7.5	.11	
11	43 234	79 201	06601	6	.0	3.6	274	8.00	1.98	-1.0	-1.0	11.2	.3	16.0	16.0	10.8	1.3	40.5	7.6	.12	
12	43 234	79 201	06601	6	102.0	3.6	271	7.90	1.73	-1.0	-1.0	11.6	.4	17.5	15.0	10.8	1.4	40.6	7.5	.14	
13	43 195	79 176	06601	7	.0	3.4	273	7.97	1.80	-1.0	-1.0	12.6	.5	18.0	18.0	-1.0	1.3	40.2	8.0	.14	
14	43 195	79 176	06601	7	89.0	3.5	-1	7.85	1.92	-1.0	-1.0	13.0	.3	17.5	14.0	11.2	1.4	40.3	8.0	.11	
15	43 153	79 148	06601	8	.0	2.1	278	7.96	1.84	-1.0	-1.0	15.8	.5	18.0	20.0	11.4	1.3	40.5	8.1	.14	
16	43 153	79 148	06601	8	15.0	5.0	273	7.96	1.84	-1.0	-1.0	15.2	.5	-1.0	23.0	11.5	1.4	40.0	8.1	.11	
17	43 206	78 507	06601	9	.0	.5	280	7.78	2.02	-1.0	-1.0	24.7	.4	-1.0	16.0	-1.0	1.3	40.5	7.8	.15	
18	43 206	78 507	06601	9	24.0	2.0	274	7.87	2.04	-1.0	-1.0	25.3	.5	17.0	14.0	11.5	1.5	40.1	8.0	.12	
19	43 249	78 522	06601	10	.0	3.8	281	7.99	1.65	-1.0	-1.0	-1.0	-1.0	-1.0	24.0	-1.0	1.4	39.8	8.1	.12	
20	43 249	78 522	06601	10	113.0	4.0	275	7.98	1.68	-1.0	-1.0	-1.0	-1.0	16.0	13.0	11.3	1.3	40.4	7.9	.11	
21	43 292	78 541	06601	11	.0	3.7	273	8.01	1.62	-1.0	-1.0	-1.0	.3	25.5	27.0	10.6	1.3	40.9	7.3	.12	
22	43 292	78 541	06601	11	138.0	3.0	271	7.99	1.90	-1.0	-1.0	-1.0	.3	16.0	13.0	10.8	1.3	40.3	8.0	.13	
23	43 341	78 561	06601	12	.0	3.5	271	7.80	1.99	-1.0	-1.0	18.6	-1.0	-1.0	25.0	11.0	1.2	40.4	7.5	.12	
24	43 341	78 561	06601	12	132.0	3.4	270	7.83	1.94	-1.0	-1.0	5.3	-1.0	16.5	22.0	10.8	1.4	40.1	7.9	.13	
25	43 384	78 575	06601	13	.0	3.4	272	7.89	2.08	-1.0	-1.0	-1.0	.3	17.0	16.0	11.2	1.3	39.9	7.9	.12	
26	43 384	78 575	06601	13	117.0	3.4	270	7.84	2.26	-1.0	-1.0	-1.0	1.5	18.0	15.0	11.0	1.3	40.4	7.9	.12	
27	43 429	78 589	06601	14	.0	2.4	275	7.91	2.29	-1.0	-1.0	-1.0	-1.0	17.5	14.0	11.0	1.2	42.5	6.7	.13	
28	43 429	78 589	06601	14	82.0	2.8	271	7.88	2.18	-1.0	-1.0	-1.0	-1.0	-1.0	19.0	10.8	1.4	42.8	6.5	.13	
29	43 473	79 6	06601	15	.0	1.6	264	7.92	1.94	-1.0	-1.0	14.7	.3	18.0	22.0	11.8	1.4	42.2	7.6	.14	
30	43 473	79 6	06601	15	16.0	1.8	272	7.95	2.02	-1.0	-1.0	13.9	.3	23.0	50.0	-1.0	1.3	40.4	7.8	.11	
31	43 520	78 310	06601	16	.0	1.2	277	7.93	.92	-1.0	-1.0	-1.0	-1.0	17.5	16.0	11.1	-1.0	41.1	7.7	.13	
32	43 520	78 310	06601	16	28.0	1.8	275	7.88	2.02	-1.0	-1.0	-1.0	-1.0	18.0	24.0	11.3	1.5	40.6	7.8	.10	
33	43 473	78 305	06601	17	.0	2.2	278	7.85	1.36	-1.0	-1.0	-1.0	-1.0	-1.0	14.0	11.3	1.3	40.4	8.2	.12	
34	43 473	78 305	06601	17	71.0	2.6	272	7.90	1.94	-1.0	-1.0	-1.0	-1.0	25.0	22.0	12.5	1.4	40.2	7.9	.11	
35	43 427	78 299	06601	18	.0	2.9	272	7.85	1.60	-1.0	-1.0	11.9	.3	-1.0	-1.0	11.0	1.2	40.0	8.2	.12	
36	43 427	78 299	06601	18	104.0	3.0	274	7.93	1.80	-1.0	-1.0	11.3	.3	23.0	19.0	10.9	1.3	39.9	8.3	.11	
37	43 379	78 293	06601	19	.0	3.4	276	7.89	1.48	-1.0	-1.0	-1.0	-1.0	17.0	22.0	11.1	1.4	40.6	7.7	.10	
38	43 379	78 293	06601	19	150.0	4.0	276	7.84	.96	-1.0	-1.0	-1.0	-1.0	17.0	12.0	10.8	1.3	40.5	7.6	.10	
39	43 330	78 286	06601	20	.0	3.9	300	7.89	1.19	-1.0	-1.0	12.7	.3	-1.0	25.0	10.7	1.3	40.2	8.0	.11	
40	43 330	78 286	06601	20	173.0	4.0	271	7.88	1.19	-1.0	-1.0	11.8	.4	17.5	20.0	11.2	1.3	40.2	7.7	.11	
41	43 282	78 281	06601	21	.0	3.8	277	7.90	1.10	-1.0	-1.0	-1.0	-1.0	26.0	17.0	11.8	1.3	40.4	7.7	.13	
42	43 282	78 281	06601	21	82.0	4.5	273	7.86	1.19	-1.0	-1.0	-1.0	-1.0	24.0	28.0	10.5	1.3	40.2	8.0	.13	
43	43 236	78 275	06601	22	.0	.9	275	7.98	1.16	-1.0	-1.0	17.6	.5	27.0	20.0	12.0	1.3	39.8	8.2	.12	
44	43 236	78 275	06601	22	27.0	4.5	276	7.92	1.33	-1.0	-1.0	19.0	.5	18.0	18.0	10.1	1.4	40.4	8.1	.11	
45	43 241	78 0	06601	23	.0	2.4	278	7.85	1.98	-1.0	-1.0	13.7	.2	28.0	-1.0	-1.0	1.3	40.1	8.0	.13	
46	43 241	78 0	06601	23	43.0	2.5	273	7.88	1.96	-1.0	-1.0	13.2	.2	18.0	-1.0	12.2	1.4	40.6	7.9	.14	
47	43 297	77 599	06601	24	.0	4.0	280	7.92	1.85	-1.0	-1.0	-1.0	-1.0	27.0	14.0	-1.0	1.2	40.4	8.0	.12	
48	43 297	77 599	06601	24	149.0	4.1	277	7.83	1.89	-1.0	-1.0	-1.0	-1.0	24.0	21.0	11.0	1.4	40.3	7.8	.13	
49	43 347	78 0	06601	25	.0	4.1	277	7.84	2.04	-1.0	-1.0	12.2	.3	17.5	13.0	11.6	1.7	40.1	8.0	.12	
50	43 347	78 0	06601	25	172.0	4.2	277	7.86	1.85	-1.0	-1.0	11.9	.3	18.0	24.0	11.5	1.4	40.1	7.7	.14	
51	43 401	78 0	06601	26	.0	4.0	276	7.87	2.30	-1.0	-1.0	-1.0	-1.0	17.5	-1.0	11.5	1.3	40.1	7.9	.13	
52	43 401	78 0	06601	26	152.0	4.1	274	7.90	2.20	-1.0	-1.0	-1.0	-1.0	17.5	21.0	11.2	1.5	40.1	7.9	.13	
53	43 456	78 0	06601	27	.0	3.0	272	7.89	2.15	-1.0	-1.0	9.7	.1	17.5	54.0	12.2	1.4	39.9	7.6	.13	
54	43 456	78 0	06601	27	108.0	3.6	274	7.90	2.12	-1.0	-1.0	10.3	.3	-1.0	14.0	11.6	1.3	40.4	7.9	.11	
55	43 510	78 1	06601	28	.0	1.7	270	7.88	2.04	-1.0	-1.0	-1.0	-1.0	-1.0	9.0	10.4	1.3	40.2	8.0	.12	
56	43 510	78 1	06601	28	50.0	2.3	269	7.95	2.16	-1.0	-1.0	-1.0	-1.0	24.0	20.0	11.1	1.3	40.1	7.5	.12	
57	43 562	77 599	06601	29	.0	.9	274	7.80	1.88	-1.0	-1.0	11.2	.3	-1.0	20.0	11.3	1.3	42.3	6.9	.13	
58	43 562	77 599	06601	29	20.0	1.5	272	7.81	1.88	-1.0	-1.0	10.5	.3	24.0	10.0	11.5	1.4	40.8	7.8	.15	
59	43 564	77 377	06601	30	.0	.5	277	7.95	1.62	-1.0	-1.0	11.0	.3	25.0	25.0	11.0	1.4	40.5	7.4	.13	
60	43 564	77 377	06601	30	21.0	1.2	272	7.97	1.75	-1.0	-1.0	13.4	.2	25.0	18.0	10.8	1.3	40.3	7.5	.11	
61	43 507	77 370	06601	31	.0	1.2	276	7.90	1.76	-1.0	-1.0	11.6	.2	-1.0	13.0	11.1	1.2	40.6	7.8	-1.00	
62	43 507	77 370	06601	31	54.0	3.5	274	7.81	1.73	-1.0	-1.0	16.4	.3	26.0	24.0	11.0	1.4	40.1	8.1	.13	
63	43 450	77 363	06601	32	.0	1.5	275	7.74	1.90	-1.0	-1.0	-1.0	-1.0	23.0	17.0	11.4	1.6	40.4	7.8	.13	
64	43 450	77 363	06601	32	49.0	1.7	274	7.88	1.76	-1.0	-1.0	-1.0	-1.0	27.0	11.0	11.0	1.3	40.5	8.0	.12	
65	43 395	77 356	06601	33	.0	3.8	280	7.82	1.77	-1.0	-1.0	12.1	.3	23.0	21.0	11.5	1.3	39.9	8.6	.14	
66	43 395	77 356	06601	33	123.0	3.0	274	7.80	1.74	-1.0	-1.0	11.3	.3	27.0	11.0	11.5	1.3	40.4	8.4	.12	
67	43 340	77 346	06601	34	.0	4.3	273	7.79	1.81	-1.0	-1.0	-1.0	-1.0	28.0	28.0	12.2	1.3	40.1	8.6	.14	
68	43 340	77 346	06601	34	179.0	5.0	275	7.86	1.81	-1.0	-1.0	-1.0	-1.0	24.5	46.0	11.5	1.3	40.6	7.9	.14	
69	43 280	77 342	06601	35	.0	4.2	278	7.81	1.81	-1.0	-1.0	10.6	.3	20.5	24.0	-1.0	1.3	40.2	8.3	.11	
70	43 280	77 342	06601	35	106.0	4.0	275	7.82	1.75	-1.0	-1.0	10.6	.3	24.0	14.0	11.4	1.2	39.8	8.3	.10	
71	43 222	77 331	06601	36	.0	4.1	291	7.80	1.78	-1.0	-1.0	-1.0	-1.0	44.0	21.0	-1.0	1.6	40.3	8.1	.13	
72	43 222	77 331	06601	36	83.0	5.0	274	7.80	1.76	-1.0	-1.0	-1.0	-1.0	22.0	27.0	11.0	1.4	40.3	8.0	.13	
73	43 166	77 322	06601	37	.0	1.7	279	7.81	1.71	-1.0	-1.0	17.3	-1.0	-1.0	21.0	11.6	1.4	40.8	7.9	.12	
74	43 166	77 322	06601	37	19.0	1.5	275	7.80	2.18	-1.0	-1.0	12.7	-1.0	-1.0	17.0	11.2	1.3	40.7	7.8	.12	
75	43 184	77 81	06601	38	.0	1.1	274	7.81	1.91	-1.0	-1.0	-1.0	.3	23.0	10.0	11.5	1.2	40.3	8.4	.13	
76	43 184	77 81	06601	38	20.0	1.8	270	7.83	2.06	-1.0	-1.0	-1.0	.3	-1.0	26.0	11.1	1.6	40.5	8.3	.15	
77	43 234	77 82	06601	40	.0	4.2	281	7.84	1.82	-1.0	-1.0	-1.0	-1.0	21.0	25.0	10.9	1.5	39.6	8.3	.15	
78	43 234	77 82	06601	40	162.0	4.2	276	7.78	2.20	-1.0	-1.0	-1.0	-1.0	20.5	15.0	10.8	1.3	42.7	8.0	.13	
79	43 285	77 83	06601	42	.0	4.4	281	7.82	1.82	-1.0	-1.0	-1.0	-1.0	21.0	-1.0	11.1	1.4	40.6	8.0	.13	
80	43 285	77 83	06601	42	215.0	4.4	283	7.80	1.71	-1.0	-1.0	-1.0	-1.0	20.5	19.0	11.2	1.5	40.8	7.8	.15	
81	43 338	77 87	06601	44	.0	4.2	275	7.79	1.48	-1.0	-1.0	13.1	.1	-1.0	21.0	11.2	1.3	41.1	7.5	.15	
82	43 338	77 87	06601	44	161.0	4.0	271	7.77	1.48	-1.0	-1.0	12.1	.1	20.5	43.0	11.2	1.4	40.0	8.6	.11	
83	43 386	77 90	06601	46	.0	4.0	283	7.77	1.55	-1.0	-1.0	-1.0	-1.0	21.0	81.0	11.2	1.3	40.5	8.2	.11	
84	43 386	77 90	06601	46	118.0	3.0	277	7.78	1.58	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	11.6	1.3	40.5	7.9	.11	
85	43 435	77 87	06601	48	.0	1.9	277	7.79	1.83	-1.0	-1.0	-1.0	-1.0	20.5	22.0	11.3	1.3	40.6	8.0	.11	
86	43 435	77 87	06601	48	99.0	2.0	272	7.73	1.74	-1.0	-1.0	-1.0	-1.0	-1.0	19.0	11.4	1.4	40.7	8.0	.11	
87	43 479	77 86	06601	50	.0	.7	276	7.82	1.84	-1.0	-1.0	13.7	.1	-1.0	20.0	11.2	1.3	41.0	7.9	.11	
88	43 479	77 86	06601	50	19.0	1.0	880	7.80	1.74	-1.0	-1.0	17.9	.1	20.5	8.0	11.6	1.6	40.7	9.4	.13	
89	43 518	76 436	06601	51	.0	1.7	276	7.81	1.80	-1.0	-1.0	13.1	.1	19.5	22.0	10.8	1.4	41.0	7.8	.14	
90	43 518	76 436	06601	51	38.0	1.5	269	7.83	1.69	-1.0	-1.0	12.3	.2	21.0	18.0	10.9	1.3	40.1	8.5	.13	
91	43 458	76 423	06601	52	.0	2.3	280	7.71	2.06	-1.0	-1.0	-1.0	-1.0	17.0	26.0	11.1	1.3	39.9	8.8	.14	
92	43 458	76 423	06601	52	73.0	2.0	271	7.81	2.04	-1.0	-1.0	-1.0	-1.0	19.5	27.0	10.9	-1.0	39.9	8.4	.14	
93	43 400	76 416	06601	53	.0	3.2	278	7.83	2.12	-1.0	-1.0	-1.0	-1.0	17.5	31.0	11.6	1.4	39.8	8.2	.13	
94	43 400	76 416	06601	53	131.0	2.5	278	7.85	-1.00	-1.0	-1.0	-1.0	-1.0	20.5	35.0	11.2	1.3	43.3	6.1	.10	

I	LAT		LONG		CRUIS	ST	DEPTH	TEMP	CON	PH	ALK	O2	PS	PHOS	SIO2	CL	SO4	NA	K	CA	MG	F	STATION COMMENT
	--DEG, MIN*10.--						M	C	MUMHO		MEQ/L	PPM		PPB(P)	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	
95	43	353	76	409	06601	54	.0	4.4	270	7.87	2.08	-1.0	-1.0	12.0	.3	21.0	8.0	11.1	1.6	39.2	8.5	.14	
96	43	353	76	409	06601	54	213.0	4.4	272	7.85	1.96	-1.0	-1.0	11.5	.2	19.5	18.0	11.5	1.4	39.9	8.2	.13	
97	43	305	76	404	06601	55	.0	4.1	278	7.85	2.07	-1.0	-1.0	-1.0	-1.0	81.0	23.0	11.0	1.3	39.7	8.4	.13	
98	43	258	76	396	06601	56	.0	.9	278	7.93	2.10	-1.0	-1.0	16.6	-1.0	20.5	24.0	11.2	1.4	40.4	8.0	.13	
99	43	258	76	396	06601	56	29.0	2.8	278	7.88	1.89	-1.0	-1.0	13.6	-1.0	21.0	22.0	11.0	1.4	39.7	7.9	.12	
100	43	331	76	225	06601	57	.0	.2	291	7.79	1.48	-1.0	-1.0	27.9	.1	25.0	12.0	-1.0	1.4	42.0	8.4	.12	
101	43	331	76	225	06601	57	30.0	1.3	284	7.56	1.66	-1.0	-1.0	15.4	.2	20.5	36.0	11.5	1.3	40.0	8.7	.12	
102	43	386	76	225	06601	58	.0	1.0	278	7.94	1.86	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	12.1	1.4	39.6	8.3	.11	
103	43	386	76	225	06601	58	70.0	3.5	274	7.92	2.04	-1.0	-1.0	-1.0	-1.0	21.0	17.0	11.8	1.4	40.0	8.1	.12	
104	43	442	76	228	06601	59	.0	1.0	277	7.74	1.80	-1.0	-1.0	-1.0	-1.0	21.0	22.0	-1.0	1.4	40.1	8.1	.12	
105	43	442	76	228	06601	59	40.0	1.8	275	7.75	1.80	-1.0	-1.0	-1.0	-1.0	21.5	16.0	11.4	1.3	40.1	7.3	.11	
106	43	498	76	230	06601	60	.0	.6	273	7.77	1.89	-1.0	-1.0	10.0	.3	21.0	28.0	11.8	1.4	40.1	8.1	.13	
107	43	498	76	230	06601	60	24.0	1.2	266	7.84	1.96	-1.0	-1.0	9.9	.2	-1.0	24.0	11.2	1.2	40.5	8.0	.10	
108	43	550	76	151	06601	61	.0	.9	276	7.86	1.46	-1.0	-1.0	-1.0	-1.0	21.0	19.0	-1.0	-1.0	39.8	8.0	.12	
109	43	550	76	151	06601	61	19.0	1.5	279	7.74	1.44	-1.0	-1.0	-1.0	-1.0	21.0	24.0	11.9	1.3	40.0	7.8	.10	
110	43	578	76	211	06601	62	.0	.1	268	7.89	1.94	-1.0	-1.0	-1.0	-1.0	-1.0	15.0	11.6	1.4	39.4	8.9	.13	
111	43	578	76	211	06601	62	17.0	2.0	266	7.85	1.89	-1.0	-1.0	-1.0	-1.0	20.5	-1.0	11.3	1.3	39.5	8.0	.13	
112	43	590	76	299	06601	63	.0	.6	275	7.86	1.82	-1.0	-1.0	-1.0	-1.0	18.5	34.0	11.3	1.3	39.7	8.3	.11	
113	43	590	76	299	06601	63	45.0	.5	278	7.85	1.86	-1.0	-1.0	-1.0	-1.0	19.5	-1.0	11.3	1.3	39.6	8.5	.12	
114	43	588	76	398	06601	64	.0	.4	274	7.80	1.46	-1.0	-1.0	-1.0	-1.0	21.0	16.0	-1.0	1.4	40.3	8.0	.14	
115	43	588	76	398	06601	64	32.0	.5	272	7.80	1.44	-1.0	-1.0	-1.0	-1.0	20.5	18.0	11.1	1.4	40.0	8.1	.12	
116	43	456	78	0	06601	27	-.0	5.0	-1	7.40	-1.00	-1.0	-1.0	83.0	25.2	-1.0	-1.0	10.5	2.6	56.0	6.0	-1.00	
117	43	456	78	0	06601	27	-2.0	5.0	-1	7.30	-1.00	-1.0	-1.0	37.0	12.3	-1.0	-1.0	11.4	2.5	43.2	14.7	-1.00	
118	43	386	76	228	06601	58	-.0	5.0	-1	7.48	-1.00	-1.0	-1.0	62.0	15.0	-1.0	-1.0	13.1	3.2	45.6	11.0	-1.00	
119	43	386	96	228	06601	58	-2.0	5.0	-1	7.10	-1.00	-1.0	-1.0	62.0	11.0	-1.0	-1.0	9.8	2.8	44.8	7.7	-1.00	

WHEN NOTE=1, IONIC STRENGTH CALCULATED FROM CONDUCTIVITY. =2, IONIC STRENGTH ASSUMED ZERO. =3, IONIC STRENGTH GREATER THAN .005.
WHEN A SATURATION IS NEGATIVE, UNDERSATURATION OCCURS. WHEN POSITIVE, SUPERSATURATION./

H6678 1966 SUMMER NORTHCHANNEL,LAKE HURON SUTHERLAND,PHOS+CORE WATER

I	LAT --DEG,	MIN*10,--	LONG --DEG,	MIN*10,--	CRUIS	ST	DEPTH M	TEMP C	CON MUMHO	PH	ALK MEQ/L	O2 PPM	PS	PHOS PPB(P)	SIO2 PPM	CL PPM	SO4 PPM	NA PPM	K PPM	CA PPM	MG PPM	F PPM	STATION COMMENT
1	46	62	81	462	H6678	1	-.0	17.0	-1	7.30	2.04	-1.0	-1.0	-1.0	48.0	-1.0	-1.0	7.6	35.2	-1.0	-1.0	-1.00	
2	46	62	81	462	H6678	1	-3.0	15.0	-1	7.50	2.77	-1.0	-1.0	-1.0	62.0	-1.0	-1.0	5.6	2.5	27.8	10.6	-1.00	
3	46	52	81	528	H6678	2	23.0	13.5	-1	7.25	1.73	-1.0	-1.0	-1.0	3.5	-1.0	-1.0	3.1	1.6	19.6	5.8	.06	
4	46	52	81	528	H6678	2	-.0	14.0	-1	7.50	2.46	-1.0	-1.0	-1.0	64.3	-1.0	-1.0	4.2	1.8	25.0	8.2	-1.00	
5	46	52	81	528	H6678	2	-.5	15.0	-1	6.70	2.94	-1.0	-1.0	-1.0	66.7	-1.0	-1.0	5.3	3.6	30.2	12.4	-1.00	
6	46	52	81	528	H6678	2	-3.0	15.0	-1	7.50	3.24	-1.0	-1.0	-1.0	62.0	-1.0	-1.0	7.4	36.0	11.3	30.8	-1.00	
7	46	63	81	438	H6678	4	-.0	7.0	-1	6.77	1.96	-1.0	-1.0	-1.0	37.3	-1.0	-1.0	2.4	16.0	8.9	4.8	-1.00	LAT AND LONG _ (N
8	46	63	81	438	H6678	4	-.8	7.0	-1	6.35	2.76	-1.0	-1.0	-1.0	55.7	-1.0	-1.0	4.5	2.8	17.9	10.5	-1.00	LAT AND LONG _ (
9	46	62	81	462	H6678	5	-.0	9.0	-1	6.63	1.84	-1.0	-1.0	-1.0	39.2	-1.0	-1.0	2.8	1.6	10.8	3.7	-1.00	
10	46	62	81	462	H6678	5	-3.0	9.0	-1	6.84	2.88	-1.0	-1.0	-1.0	61.0	-1.0	-1.0	4.4	2.0	28.2	8.1	-1.00	
11	46	62	81	462	H6678	5	-4.5	9.0	-1	6.70	3.89	-1.0	-1.0	-1.0	65.3	-1.0	-1.0	6.0	29.6	40.5	14.9	-1.00	
12	45	299	82	20	H6678	6	.0	15.5	159	7.70	2.44	-1.0	-1.0	-1.0	1.0	-1.0	14.3	2.9	1.0	26.2	9.0	.11	SOUTH BAYMOUTH,MA
13	45	299	82	20	H6678	6	24.0	7.0	156	7.23	2.36	-1.0	-1.0	-1.0	1.3	-1.0	4.2	2.6	1.0	25.0	6.6	.20	SOUTH BAYMOUTH MA
14	45	299	82	20	H6678	6	-.0	7.0	-1	8.25	3.04	-1.0	-1.0	-1.0	18.0	-1.0	-1.0	4.5	2.0	29.6	12.4	-1.00	SOUTH BAYMOUTH MA
15	45	299	82	20	H6678	6	-1.0	7.0	-1	7.55	3.64	-1.0	-1.0	-1.0	26.3	-1.0	-1.0	3.8	5.8	37.2	11.5	-1.00	SOUTH BAYMOUTH MA
16	45	299	82	20	H6678	6	-3.5	6.5	-1	7.09	3.96	-1.0	-1.0	-1.0	40.5	-1.0	-1.0	4.0	1.8	46.2	12.9	-1.00	SOUTH BAYMOUTH MA
17	46	93	82	92	H6678	7	.0	22.0	72	7.45	2.22	-1.0	-1.0	-1.0	3.6	-1.0	15.5	3.3	1.0	10.8	2.6	.12	
18	46	93	82	92	H6678	7	28.0	10.0	81	7.77	2.18	-1.0	-1.0	-1.0	4.0	-1.0	16.5	3.2	1.3	12.3	3.3	.11	
19	46	93	82	92	H6678	7	-.0	10.0	-1	6.25	2.67	-1.0	-1.0	-1.0	72.5	-1.0	-1.0	4.2	1.8	17.8	16.7	-1.00	
20	46	93	82	92	H6678	7	-1.5	9.0	-1	6.59	3.20	-1.0	-1.0	-1.0	72.5	-1.0	-1.0	4.4	12.0	23.4	22.3	-1.00	
21	46	93	82	92	H6678	7	-3.5	8.0	-1	6.50	3.50	-1.0	-1.0	-1.0	77.0	-1.0	-1.0	7.9	2.6	31.0	17.5	-1.00	
22	46	59	82	326	H6678	8	.0	18.5	117	7.12	2.49	-1.0	-1.0	-1.0	1.8	-1.0	14.4	2.9	1.2	18.2	4.8	.03	LAT,LONG _(NC-6)
23	46	59	82	326	H6678	8	39.0	7.0	136	8.22	2.40	-1.0	-1.0	-1.0	2.3	-1.0	14.3	2.8	1.2	20.6	5.8	.04	LAT,LONG _(NC-6)
24	46	59	82	326	H6678	8	-.0	7.0	-1	6.30	2.54	-1.0	-1.0	-1.0	37.5	-1.0	-1.0	4.1	2.8	20.0	7.5	-1.00	LAT,LONG _(NC-6)
25	46	59	82	326	H6678	8	-2.5	6.0	-1	6.30	2.91	-1.0	-1.0	-1.0	83.0	-1.0	-1.0	8.0	14.0	22.8	9.0	-1.00	LAT, LONG_(NC-6)
26	46	59	82	326	H6678	8	-5.0	5.5	-1	7.12	3.27	-1.0	-1.0	-1.0	27.5	-1.0	-1.0	10.0	2.4	32.5	9.5	-1.00	LAT, LONG_(NC-6)
27	46	98	82	444	H6678	9	.0	20.0	118	8.25	2.34	-1.0	-1.0	-1.0	1.7	-1.0	16.1	2.6	1.0	17.9	4.9	.12	
28	46	98	82	444	H6678	9	25.0	9.0	118	8.10	2.16	-1.0	-1.0	-1.0	2.6	-1.0	15.3	2.6	1.4	18.5	5.3	.08	
29	46	98	82	444	H6678	9	-.0	8.0	-1	7.00	2.76	-1.0	-1.0	-1.0	57.0	-1.0	-1.0	7.9	14.4	24.2	13.1	-1.00	
30	46	98	82	444	H6678	9	-1.3	7.0	-1	6.89	3.90	-1.0	-1.0	-1.0	57.0	-1.0	-1.0	5.0	2.5	35.2	15.5	-1.00	
31	46	98	82	444	H6678	9	-2.7	6.5	-1	6.97	5.41	-1.0	-1.0	-1.0	59.0	-1.0	-1.0	7.0	2.4	49.5	18.3	-1.00	
32	46	64	82	470	H6678	10	.0	22.0	118	7.90	2.39	-1.0	-1.0	-1.0	1.6	-1.0	15.6	2.6	1.0	18.3	5.7	.06	
33	46	64	82	470	H6678	10	32.0	7.0	133	7.10	2.32	-1.0	-1.0	-1.0	2.3	-1.0	13.1	3.2	1.1	20.6	6.4	.12	
34	46	64	82	470	H6678	10	-.0	6.5	-1	7.22	2.50	-1.0	-1.0	-1.0	48.5	-1.0	-1.0	14.3	1.9	22.1	7.8	-1.00	
35	46	64	82	470	H6678	10	-1.5	6.0	-1	7.20	2.79	-1.0	-1.0	-1.0	59.0	-1.0	-1.0	5.0	5.0	31.4	9.4	-1.00	
36	46	64	82	470	H6678	10	-3.5	5.0	-1	7.41	3.22	-1.0	-1.0	-1.0	50.5	-1.0	-1.0	7.5	2.0	43.3	13.8	-1.00	
37	46	85	82	208	H6678	11	.0	21.0	127	7.95	2.11	-1.0	-1.0	-1.0	1.5	-1.0	14.7	2.6	1.2	18.2	5.3	.13	
38	46	85	82	208	H6678	11	39.0	8.0	120	8.34	2.05	-1.0	-1.0	-1.0	2.7	-1.0	15.5	2.8	1.1	19.2	6.1	.10	
39	46	85	82	208	H6678	11	-.0	7.5	-1	7.06	2.61	-1.0	-1.0	-1.0	61.0	-1.0	-1.0	4.6	1.8	27.2	9.0	-1.00	
40	46	85	82	208	H6678	11	-2.2	7.0	-1	7.17	3.51	-1.0	-1.0	-1.0	60.0	-1.0	-1.0	5.0	2.4	35.3	11.8	-1.00	
41	46	85	82	208	H6678	11	-4.2	6.0	-1	7.08	5.96	-1.0	-1.0	-1.0	62.5	-1.0	-1.0	7.9	3.7	55.7	20.4	-1.00	
42	47	0	81	290	H6678	12	.0	20.0	20	6.65	1.52	-1.0	-1.0	3.5	2.9	-1.0	13.7	1.4	1.2	4.5	1.2	.10	LAKE ONAPING _(
43	47	0	81	290	H6678	12	53.0	8.0	16	6.25	1.53	-1.0	-1.0	-1.0	4.7	-1.0	12.2	1.1	.6	3.7	1.4	.11	LAKE ONAPING (
44	47	0	81	290	H6678	12	-.0	6.5	-1	6.62	1.95	-1.0	-1.0	-1.0	23.0	-1.0	-1.0	3.2	1.2	14.1	3.0	-1.00	LAKE ONAPING (
45	47	0	81	290	H6678	12	-1.5	5.0	-1	6.68	2.95	-1.0	-1.0	-1.0	36.5	-1.0	-1.0	2.4	1.0	7.0	5.7	-1.00	LAKE ONAPING (
46	45	364	82	185	H6678	13	.0	16.0	158	8.43	1.89	-1.0	-1.0	3.5	1.0	-1.0	14.9	2.8	1.0	26.6	6.6	.11	PROVIDENCE BAY _(
47	45	364	82	185	H6678	13	51.0	5.0	166	8.10	1.93	-1.0	-1.0	-1.0	2.1	-1.0	14.6	3.3	1.9	25.6	8.5	.15	PROVIDENCE BAY, (
48	45	364	82	185	H6678	13	-.0	5.0	-1	7.63	2.52	-1.0	-1.0	-1.0	22.5	-1.0	-1.0	5.0	1.7	31.2	10.9	-1.00	PROVIDENCE BAY, (
49	45	364	82	185	H6678	13	-1.2	5.0	-1	7.39	2.74	-1.0	-1.0	-1.0	26.2	-1.0	-1.0	8.0	7.2	27.5	10.1	-1.00	PROVIDENCE BAY, (
50	45	364	82	185	H6678	13	-2.5	5.0	-1	7.62	2.87	-1.0	-1.0	-1.0	22.0	-1.0	-1.0	8.1	2.6	28.1	12.5	-1.00	PROVIDENCE BAY, (
51	45	570	82	279	H6678	14	.0	20.0	136	8.15	2.06	-1.0	-1.0	1.0	1.5	-1.0	14.7	2.8	1.0	19.0	5.7	.12	GORE BAY, MAN._ (
52	45	570	82	279	H6678	14	40.0	7.0	149	8.24	2.15	-1.0	-1.0	-1.0	2.3	-1.0	12.9	3.2	1.6	21.2	5.7	.10	GORE BAY, MAN. (
53	45	570	82	279	H6678	14	-.0	7.0	-1	7.22	2.91	-1.0	-1.0	-1.0	43.5	-1.0	-1.0	4.0	1.9	27.8	7.8	-1.00	GORE BAY, MAN. (
54	45	570	82	279	H6678	14	-1.0	7.0	-1	7.28	3.70	-1.0	-1.0	-1.0	54.0	-1.0	-1.0	7.0	2.2	40.5	10.3	-1.00	GORE BAY, MAN. (
55	45	570	82	279	H6678	14	-3.0	7.0	-1	7.16	3.57	-1.0	-1.0	-1.0	56.5	-1.0	-1.0	6.9	2.2	37.0	28.2	-1.00	GORE BAY, MAN. (
56	45	553	82	91	H6678	15	.0	20.5	-1	8.28	1.75	-1.0	-1.0	-1.0	1.1	-1.0	15.1	2.6	1.1	20.2	6.2	.08	WEST BAY, MANITOU
57	45	553	82	91	H6678	15	53.0	8.0	-1	7.97	1.87	-1.0	-1.0	-1.0	2.7	-1.0	15.1	3.4	1.3	21.3	8.4	.18	WEST BAY, MANITOU
58	45	553	82	91	H6678	15	-.0	8.0	-1	7.18	2.70	-1.0	-1.0	-1.0	52.5	-1.0	-1.0	3.5	2.0	25.9	9.1	-1.00	WEST BAY, MANITOU
59	45	553	82	91	H6678	15	-1.8	7.0	-1	7.11	3.20	-1.0	-1.0	-1.0	61.0	-1.0	-1.0	5.4	3.2	42.9	17.3	-1.00	WEST BAY, MANITOU
60	45	553	82	91	H6678	15	-3.5	-1.0	-1	7.10	3.26	-1.0	-1.0	-1.0	66.5	-1.0	-1.0	6.2	2.4	47.5	20.6	-1.00	WEST BAY, MANITOU
61	46	55	81	497	H6678	16	.0	22.0	-1	8.07	1.77	-1.0	-1.0	-1.0	1.1	-1.0	15.8	2.5	1.0	17.6	5.6	.10	LAT AND LONG _ (
62	46	55	81	497	H6678	16	15.0	21.0	-1	7.53	1.84	-1.0	-1.0	-1.0	1.5	-1.0	16.1	2.4	.9	18.8	5.9	.12	LAT AND LONG _ (
63	46	55	81	497	H6678	16	-.0	17.0	-1	6.92	2.40	-1.0	-1.0	-1.0	43.5	-1.0	-1.0	3.3	1.8	17.9	6.8	-1.00	LAT AND LONG _ (
64	46	55	81	497	H6678	16	-2.5	13.0	-1	6.94	3.22	-1.0	-1.0	-1.0	69.0	-1.0	-1.0	6.2	2.4	30.4	13.4	-1.00	LAT AND LONG _ (
65	46	55	81	497	H6678	16	-5.5	9.0	-1	6.95	4.21	-1.0	-1.0	-1.0	61.2	-1.0	-1.0	8.9	2.1	39.0	15.7	-1.00	LAT AND LONG _ (
66	46	39	82	108	H6678	17	.0	21.0	-1	8.10	1.57	-1.0	-1.0	-1.0	1.1	-1.0	12.2	2.7	1.0	20.6	6.4	.14	
67	46	39	82	108	H6678	17	28.0	10.0	-1	7.09	1.42	-1.0	-1.0	-1.0	2.3	-1.0	14.8	2.7	.9	20.2	6.5	.09	
68	46	39	82	108	H6678	17	-.0	9.5	-1	7.04	2.33	-1.0	-1.0	-1.0	49.0	-1.0	-1.0	3.2	1.6	23.2	10.4	-1.00	
69	46	39	82	108	H6678	17	-2.0	9.0	-1	6.98	3.67	-1.0	-1.0	-1.0	52.5	-1.0	-1.0	7.4	3.5	39.0	15.2	-1.00	
70	46	39	82	108	H6678	17	-4.0	8.0	-1	7.16	4.87	-1.0	-1.0	-1.0	55.5	-1.0	-1.0	7.3	2.2	46.7	16.9	-1.00	
71	46	52	82	117	H6678	18	.0	21.0	-1	7.86	1.47	-1.0	-1.0	-1.0	1.1	-1.0	15.1	2.8	1.0	20.6	5.9	.77	
72	46	52	82	117	H6678	18	16.0	14.0	-1	6.68	1.10	-1.0	-1.0	-1.0	10.3	-1.0	16.1	2.6	1.3	19.2	7.1	.92	
73	46	52	82	117	H6678	18	-.0	14.0	-1	7.32	1.92	-1.0	-1.0	-1.0	31.5	-1.0	-1.0	3.4	1.4	19.7	5.4	-1.00	
74	46	52	82	117	H6678	18	-2.5	10.0	-1	7.05	2.43	-1.0	-1.0	-1.0	29.0	-1.0	-1.0	7.0	7.4	26.4	8.0	-1.00	
75	46	52	82	117	H6678	18	-5.0	10.0	-1	7.91	2.43	-1.0	-1.0	-1.0	25.0	-1.0	-1.0	12.5	1.7	32.8	10.6	-1.00	
76	46	50	82	126	H6678	19	-1.0	21.0	-1	-1.00	-1.00	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	19.8	6.0	-1.00	
77	46	50	82	126	H6678	19	-1.0	20.0	-1	-1.00	-1.00	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	20.4	6.2	-1.00	
78	46	63	81	438	H6678	4	-2.5	7.0	-1	6.80	2.83	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	13.5	2.8	-1.0	-1.0	-1.00	LAT AND LONG _ (

WHEN NOTE=1, IONIC STRENGTH CALCULATED FROM CONDUCTIVITY. =2, IONIC STRENGTH ASSUMED ZERO. =3, IONIC STRENGTH GREATER THAN .005.
WHEN A SATURATION IS NEGATIVE, UNDERSATURATION OCCURS. WHEN POSITIVE, SUPERSATURATION./

LAKE HURON SUMMER 1967 H-671

I	LAT		LONG		CRUIS	ST	DEPTH	TEMP	CON	PH	ALK	O2	PS	PHOS	SIO2	CL	SO4	NA	K	CA	MG	F	STATION COMMENT
	--DEG. MIN*10.--						M	C	MUMHO		MEQ/L	PPM		PPB(P)	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	
1	-0	-0	-0	-0	H-671	1	.0	23.0	159	7.39	1.26	7.7	-1.0	-1.0	1.2	6.9	17.8	2.5	.9	18.2	6.5	.13	
2	-0	-0	-0	-0	H-671	1	7.7	19.2	164	8.05	1.21	7.7	-1.0	-1.0	1.4	7.4	17.6	2.6	1.3	17.3	6.1	.19	
3	-0	-0	-0	-0	H-671	1	9.3	18.0	164	7.61	1.09	8.4	-1.0	-1.0	2.7	7.2	16.2	2.4	.8	18.1	5.5	.11	
4	-0	-0	-0	-0	H-671	1	20.6	17.0	161	7.74	1.37	8.9	-1.0	-1.0	1.7	7.6	18.2	2.5	.7	17.1	6.1	.14	
5	-0	-0	-0	-0	H-671	2	.0	20.0	-1	7.96	1.12	-1.0	-1.0	-1.0	1.1	-1.0	-1.0	2.5	.8	18.0	5.9	.13	
6	-0	-0	-0	-0	H-671	2	9.2	18.0	-1	7.56	1.15	-1.0	-1.0	-1.0	1.4	-1.0	-1.0	2.4	1.3	18.4	5.4	.11	
7	-0	-0	-0	-0	H-671	3	.0	19.5	166	8.11	.73	9.8	-1.0	-1.0	1.2	-1.0	-1.0	2.8	1.0	20.0	5.0	.16	
8	-0	-0	-0	-0	H-671	3	8.3	18.9	167	8.12	.65	9.3	-1.0	-1.0	1.4	-1.0	-1.0	2.8	.5	17.7	6.4	.14	
9	-0	-0	-0	-0	H-671	3	30.0	10.0	169	7.73	.60	7.7	-1.0	-1.0	2.9	-1.0	-1.0	2.6	.8	17.2	6.2	.13	
10	-0	-0	-0	-0	H-671	4	.0	20.5	159	8.15	.60	9.4	-1.0	-1.0	1.4	7.6	17.7	2.8	1.0	16.5	6.4	.17	
11	-0	-0	-0	-0	H-671	4	9.2	16.8	153	8.03	.37	7.9	-1.0	-1.0	.8	7.2	17.9	2.6	.9	15.9	5.6	.13	
12	-0	-0	-0	-0	H-671	5	.0	21.2	166	7.92	.49	9.1	-1.0	-1.0	.9	-1.0	-1.0	2.9	.6	17.4	5.5	.14	
13	-0	-0	-0	-0	H-671	5	9.2	20.0	156	8.04	.60	7.4	-1.0	-1.0	1.0	-1.0	-1.0	2.6	.8	16.9	5.6	.14	
14	-0	-0	-0	-0	H-671	6	.0	19.6	165	8.26	1.10	9.4	-1.0	-1.0	1.0	-1.0	-1.0	2.6	.5	18.7	5.6	.18	
15	-0	-0	-0	-0	H-671	6	9.2	15.5	165	7.90	1.08	11.0	-1.0	-1.0	1.2	-1.0	-1.0	2.4	.8	18.3	5.9	.11	
16	-0	-0	-0	-0	H-671	6	27.2	9.8	168	7.48	1.08	8.0	-1.0	-1.0	2.3	-1.0	-1.0	2.3	1.1	18.2	5.8	.16	
17	-0	-0	-0	-0	H-671	7	.0	20.0	164	8.23	1.01	9.8	-1.0	-1.0	1.1	-1.0	-1.0	2.8	.8	18.6	5.6	.16	
18	-0	-0	-0	-0	H-671	7	9.2	18.2	166	8.02	.99	9.0	-1.0	-1.0	1.2	-1.0	-1.0	2.8	.5	18.1	5.8	.16	
19	-0	-0	-0	-0	H-671	7	17.2	12.0	166	7.63	.98	8.6	-1.0	-1.0	1.9	-1.0	-1.0	2.7	.4	18.1	5.1	.14	
20	-0	-0	-0	-0	H-671	8	.0	20.0	163	8.15	1.08	9.5	-1.0	-1.0	1.1	-1.0	-1.0	2.0	1.0	18.5	5.5	.16	
21	-0	-0	-0	-0	H-671	8	9.2	17.2	165	8.06	1.08	9.8	-1.0	-1.0	1.3	-1.0	-1.0	2.6	.6	18.7	5.2	.21	
22	-0	-0	-0	-0	H-671	8	12.0	12.0	166	7.67	1.03	9.6	-1.0	-1.0	1.2	-1.0	-1.0	2.3	.5	17.9	5.1	.20	
23	-0	-0	-0	-0	H-671	9	.0	20.5	163	8.33	1.13	9.5	-1.0	-1.0	.9	-1.0	-1.0	2.0	.9	18.8	5.3	.16	
24	-0	-0	-0	-0	H-671	9	9.2	18.2	167	7.98	1.09	9.8	-1.0	-1.0	1.1	-1.0	-1.0	2.5	.7	18.5	5.6	.21	
25	-0	-0	-0	-0	H-671	9	25.8	9.5	167	8.39	1.02	8.5	-1.0	-1.0	2.2	-1.0	-1.0	2.4	.8	18.1	5.4	.10	
26	-0	-0	-0	-0	H-671	10	.0	20.8	164	8.22	1.10	9.4	-1.0	-1.0	1.2	-1.0	-1.0	2.9	.5	18.7	5.5	.17	
27	-0	-0	-0	-0	H-671	10	9.2	18.5	164	7.90	1.08	9.8	-1.0	-1.0	1.1	-1.0	-1.0	2.0	.5	18.7	5.1	.14	
28	-0	-0	-0	-0	H-671	10	17.2	10.5	168	7.34	1.02	9.4	-1.0	-1.0	1.7	-1.0	-1.0	2.6	.4	17.7	5.4	.17	
29	-0	-0	-0	-0	H-671	11	.0	20.2	167	8.15	1.12	9.6	-1.0	-1.0	1.1	-1.0	-1.0	2.6	.8	18.5	5.7	.19	
30	-0	-0	-0	-0	H-671	11	9.2	16.5	166	7.84	1.08	10.2	-1.0	-1.0	1.2	-1.0	-1.0	2.5	.6	18.3	5.6	.20	
31	-0	-0	-0	-0	H-671	11	27.2	9.0	166	7.44	1.08	8.5	-1.0	-1.0	2.2	-1.0	-1.0	2.5	1.0	18.0	5.6	.20	
32	-0	-0	-0	-0	H-671	12	.0	21.8	184	8.17	1.10	9.0	-1.0	7.8	1.2	7.4	17.0	1.7	.7	21.1	6.4	.19	
33	-0	-0	-0	-0	H-671	12	3.0	20.5	185	7.96	1.10	8.6	-1.0	3.4	1.3	9.1	17.7	2.5	1.1	21.3	6.5	.23	
34	-0	-0	-0	-0	H-671	13	.0	22.5	190	8.43	1.22	9.4	-1.0	.1	1.4	8.9	17.0	2.2	1.3	22.5	6.9	.20	
35	-0	-0	-0	-0	H-671	13	2.8	21.0	187	8.38	1.20	9.0	-1.0	2.1	1.3	8.5	17.0	2.7	.6	22.1	6.4	.20	
36	-0	-0	-0	-0	H-671	14	.0	21.2	185	7.37	1.12	10.4	-1.0	6.0	1.2	-1.0	-1.0	2.8	.8	21.6	6.1	.22	
37	-0	-0	-0	-0	H-671	14	9.2	16.8	189	7.85	1.10	10.4	-1.0	.0	1.1	-1.0	-1.0	2.3	.4	21.8	6.7	.21	
38	-0	-0	-0	-0	H-671	14	20.8	9.2	206	7.49	1.15	6.8	-1.0	.9	3.0	-1.0	-1.0	2.2	.7	22.5	6.8	.20	
39	-0	-0	-0	-0	H-671	15	.0	21.6	184	7.75	1.09	9.5	-1.0	.2	1.2	-1.0	-1.0	2.9	.6	21.5	6.4	.30	
40	-0	-0	-0	-0	H-671	15	3.0	20.5	187	7.51	1.15	9.5	-1.0	.0	1.3	-1.0	-1.0	3.0	.2	22.0	6.4	.24	
41	-0	-0	-0	-0	H-671	16	.0	21.5	164	7.46	1.00	9.8	-1.0	.0	1.1	-1.0	-1.0	2.6	.3	18.8	5.4	.13	
42	-0	-0	-0	-0	H-671	16	9.2	16.2	166	8.07	.92	10.4	-1.0	.0	1.4	-1.0	-1.0	2.0	.6	18.3	5.4	.13	
43	-0	-0	-0	-0	H-671	16	12.3	14.0	167	8.08	.91	10.2	-1.0	.0	1.4	-1.0	-1.0	2.4	.6	18.5	5.2	.17	
44	-0	-0	-0	-0	H-671	16	27.6	8.0	168	7.71	.88	8.0	-1.0	.9	2.6	-1.0	-1.0	2.1	.8	18.3	4.9	.13	
45	-0	-0	-0	-0	H-671	17	.0	19.0	164	8.23	1.09	8.8	-1.0	-1.0	1.0	-1.0	-1.0	2.8	.6	18.7	5.3	.13	
46	-0	-0	-0	-0	H-671	17	9.2	18.0	167	8.11	1.04	9.6	-1.0	-1.0	1.1	-1.0	-1.0	1.9	1.2	18.5	5.6	.14	
47	-0	-0	-0	-0	H-671	17	22.2	14.0	167	7.50	1.08	8.5	-1.0	-1.0	1.4	-1.0	-1.0	2.1	1.2	18.5	5.2	.10	
48	-0	-0	-0	-0	H-671	18	.0	20.0	164	8.23	1.04	9.4	-1.0	-1.0	1.1	-1.0	-1.0	2.5	.9	18.7	5.6	.15	
49	-0	-0	-0	-0	H-671	18	7.7	18.4	164	8.17	1.00	10.4	-1.0	-1.0	2.4	-1.0	-1.0	2.2	.7	18.7	5.8	.16	
50	-0	-0	-0	-0	H-671	18	9.2	16.8	164	7.96	.95	10.4	-1.0	-1.0	1.2	-1.0	-1.0	2.8	.3	18.2	5.6	.19	
51	-0	-0	-0	-0	H-671	18	12.0	14.0	168	7.87	.94	10.0	-1.0	-1.0	1.4	-1.0	-1.0	2.4	.6	18.7	4.9	.13	
52	-0	-0	-0	-0	H-671	19	.0	22.0	192	7.49	1.46	10.0	-1.0	-1.0	1.5	-1.0	-1.0	2.9	.3	21.9	6.3	1.30	
53	-0	-0	-0	-0	H-671	19	5.4	19.8	193	7.63	1.34	9.8	-1.0	-1.0	1.3	-1.0	-1.0	3.0	.2	18.6	8.7	1.30	
54	-0	-0	-0	-0	H-671	20	.0	21.8	190	7.25	1.40	9.7	-1.0	-1.0	1.3	-1.0	-1.0	2.8	.4	22.0	6.6	1.50	
55	-0	-0	-0	-0	H-671	20	7.5	17.0	196	7.50	1.40	10.8	-1.0	-1.0	1.5	-1.0	-1.0	2.8	.3	21.0	7.6	1.50	
56	-0	-0	-0	-0	H-671	21	.0	21.5	189	7.08	1.50	10.0	-1.0	-1.0	1.3	-1.0	-1.0	2.8	.6	22.1	6.8	1.20	
57	-0	-0	-0	-0	H-671	21	2.7	21.0	190	7.28	1.33	10.0	-1.0	-1.0	1.3	-1.0	-1.0	2.7	.4	21.3	19.3	1.20	
58	-0	-0	-0	-0	H-671	22	.0	21.6	189	7.35	1.27	10.1	-1.0	-1.0	1.2	-1.0	-1.0	2.2	.7	22.0	6.7	1.30	
59	-0	-0	-0	-0	H-671	22	8.4	16.2	194	7.46	1.36	10.6	-1.0	-1.0	1.7	-1.0	-1.0	2.2	.6	22.7	6.9	1.30	
60	-0	-0	-0	-0	H-671	23	.0	22.0	187	7.11	1.60	9.9	-1.0	-1.0	1.3	-1.0	-1.0	3.1	.4	22.7	6.4	.13	
61	-0	-0	-0	-0	H-671	23	6.0	19.8	190	7.33	1.35	10.5	-1.0	-1.0	1.2	-1.0	-1.0	2.5	.5	21.6	6.8	.13	
62	-0	-0	-0	-0	H-671	24	.0	21.8	188	7.47	1.33	10.0	-1.0	-1.0	1.5	-1.0	-1.0	2.5	.9	21.9	6.9	.15	
63	-0	-0	-0	-0	H-671	24	9.6	14.2	200	7.50	1.38	10.9	-1.0	-1.0	1.8	-1.0	-1.0	2.4	.5	22.5	6.6	.14	

WHEN NOTE=1, IONIC STRENGTH CALCULATED FROM CONDUCTIVITY. =2, IONIC STRENGTH ASSUMED ZERO. =3, IONIC STRENGTH GREATER THAN .005.
WHEN A SATURATION IS NEGATIVE, UNDERSATURATION OCCURS. WHEN POSITIVE, SUPERSATURATION./

LAKE HURON SUMMER 1967 H-672

I	LAT --DEG,	MIN*10.--	LONG --DEG,	MIN*10.--	CRUIS	ST	DEPTH M	TEMP C	CON MUMHO	PH	ALK MEQ/L	O2 PPM	PS	PHOS PPB(P)	SIO2 PPM	CL PPM	SO4 PPM	NA PPM	K PPM	CA PPM	MG PPM	F PPM	STATION COMMENT
1	-0	-0	-0	-0	H-672	1	.0	23.5	67	7.06	.55	8.8	-1.0	-1.0	1.2	3.5	16.2	2.0	1.1	14.9	2.7	.03	RAVEN L.
2	-0	-0	-0	-0	H-672	1	12.2	10.5	72	6.36	.55	4.6	-1.0	-1.0	4.5	3.7	15.8	2.4	1.3	6.4	3.2	.04	RAVEN L.
3	-0	-0	-0	-0	H-672	2	.0	24.0	107	8.29	.70	9.0	-1.0	-1.0	1.1	4.4	13.8	2.1	1.1	14.9	2.7	.05	TULLOCH L.
4	-0	-0	-0	-0	H-672	2	1.5	23.2	109	7.87	.82	9.0	-1.0	-1.0	2.0	2.2	15.1	2.0	1.1	14.9	2.0	.04	TULLOCH L.
5	-0	-0	-0	-0	H-672	3	.0	23.0	42	6.83	.30	8.3	-1.0	-1.0	.0	.8	11.1	1.4	.9	3.6	3.0	.04	PLEASANT L.
6	-0	-0	-0	-0	H-672	3	6.1	18.0	39	6.43	.30	8.2	-1.0	-1.0	.5	1.3	10.2	1.8	1.0	2.9	2.3	.03	PLEASANT L.
7	-0	-0	-0	-0	H-672	4	.0	23.8	62	6.70	.61	8.6	-1.0	-1.0	1.7	1.7	16.2	1.5	1.0	6.6	4.3	.04	PENAGE L.
8	-0	-0	-0	-0	H-672	4	-.0	7.0	69	6.21	.63	11.2	-1.0	-1.0	2.8	1.7	15.8	1.7	1.2	5.8	3.0	.03	PENAGE L.
9	-0	-0	-0	-0	H-672	5	.0	23.5	86	6.69	.28	8.9	-1.0	-1.0	.9	2.5	25.6	2.2	1.5	8.2	3.7	.05	PENAGE L.
10	-0	-0	-0	-0	H-672	5	-.0	8.5	96	6.33	.38	11.4	-1.0	-1.0	1.6	2.9	25.4	2.2	1.4	7.5	3.2	.05	PENAGE L.
11	-0	-0	-0	-0	H-672	6	.0	24.0	75	6.90	.41	6.8	-1.0	-1.0	1.2	2.5	20.9	1.8	1.0	7.5	2.9	.07	SPAN. R-HWY17
12	-0	-0	-0	-0	H-672	7	.0	22.0	45	7.00	.21	8.7	-1.0	-1.0	5.1	2.2	10.6	1.4	.6	5.1	2.2	.06	SPAN. R-HWY68
13	-0	-0	-0	-0	H-672	8	.0	22.5	108	6.78	.27	7.2	-1.0	-1.0	5.5	15.0	17.8	9.8	.0	7.6	2.0	.07	KVP EFFLUENT

WHEN NOTE=1, IONIC STRENGTH CALCULATED FROM CONDUCTIVITY. =2, IONIC STRENGTH ASSUMED ZERO. =3, IONIC STRENGTH GREATER THAN .005.
WHEN A SATURATION IS NEGATIVE, UNDERSATURATION OCCURS. WHEN POSITIVE, SUPERSATURATION./

LAKE ONAPING.SUMMER,1967. CORING.SI-P. LAT-LONG IN INCHES L-F MAP

I	LAT		LONG		CRUIS	ST	DEPTH	TEMP	CCN	PH	ALK	O2	PS	PHOS	SIO2	CL	SO4	NA	K	CA	MG	F	STATION COMMENT
	--DEG, MIN*10.--						M	C	MUMHO		MEQ/L	PPM		PPB(P)	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	
1	-12	6	-2	1	OP-67	1	.0	18.0	42	6.60	.00	-1.0	-1.0	1.0	4.0	2.3	12.4	.1	1.0	4.0	1.5	.20	
2	-12	6	-2	1	OP-67	1	5.0	14.0	33	7.43	.64	-1.0	-1.0	24.6	4.2	1.3	12.0	.1	1.1	3.9	-1.0	.15	
3	-10	4	-0	6	OP-67	2	.0	18.0	41	6.62	.64	-1.0	-1.0	1.0	4.0	2.2	12.6	.2	.6	3.8	1.2	.14	
4	-10	4	-0	6	OP-67	2	13.0	9.0	44	6.72	.79	-1.0	-1.0	3.2	4.3	2.3	12.6	.1	.6	4.1	-1.0	.07	
5	-12	5	1	2	OP-67	3	.0	21.8	36	6.72	2.34	-1.0	-1.0	1.0	3.6	1.7	11.4	.1	.5	3.6	-1.0	.15	
6	-12	5	1	2	OP-67	3	15.0	10.1	75	6.29	.00	-1.0	-1.0	3.7	6.8	1.2	10.5	.2	1.1	-1.0	-1.0	.30	
7	-9	0	3	3	OP-67	4	.0	20.0	41	6.35	.00	-1.0	-1.0	1.7	3.5	1.5	13.0	.2	.6	3.8	1.6	.18	
8	-9	0	3	3	OP-67	4	14.0	9.0	43	6.83	.00	-1.0	-1.0	4.7	3.6	1.5	13.4	.2	.8	4.0	1.7	.13	
9	-5	8	1	4	OP-67	5	.0	20.0	39	6.63	.00	-1.0	-1.0	.7	3.9	1.4	12.8	.1	1.2	4.0	1.3	.15	
10	-5	8	1	4	OP-67	5	6.0	15.0	39	6.34	.00	-1.0	-1.0	2.3	4.1	1.7	12.7	.1	.5	3.8	-1.0	.16	
11	-3	2	-2	5	OP-67	6	.0	22.0	37	6.53	.23	-1.0	-1.0	.8	3.0	1.3	12.4	.1	.8	3.9	1.8	.14	
12	-3	2	-2	5	OP-67	6	7.0	13.0	42	6.51	.00	-1.0	-1.0	3.9	3.6	1.3	12.8	.1	1.1	3.9	1.4	.06	
13	-3	3	4	2	OP-67	7	.0	20.5	39	6.59	.00	-1.0	-1.0	1.9	3.6	1.4	12.6	.1	.1	3.9	1.4	.14	
14	-3	3	4	2	OP-67	7	14.0	11.5	41	6.35	.00	-1.0	-1.0	2.6	3.6	1.5	13.2	.1	.8	3.4	1.9	.14	
15	-7	2	-0	4	OP-67	8	.0	21.0	37	6.73	.02	-1.0	-1.0	3.0	3.4	1.4	12.6	.1	.8	4.1	1.4	.14	
16	-7	2	-0	4	OP-67	8	9.0	14.0	47	6.47	-1.00	-1.0	-1.0	1.6	3.9	2.2	12.4	.1	1.0	3.8	1.5	.17	
17	-0	2	6	2	OP-67	9	.0	17.1	41	6.80	.13	9.6	-1.0	5.1	4.3	2.3	13.0	.1	1.1	3.9	1.4	.15	
18	-0	2	6	2	OP-67	9	6.0	16.0	42	6.87	.00	7.4	-1.0	1.9	4.1	1.4	12.4	.1	1.1	4.1	3.8	.13	
19	3	9	9	9	OP-67	10	.0	17.0	42	6.74	1.00	9.8	-1.0	-1.0	4.1	1.7	12.7	.1	.7	4.4	1.6	.16	
20	3	9	9	9	OP-67	10	11.0	15.0	41	6.69	.00	7.4	-1.0	-1.0	4.1	1.5	12.8	.2	1.0	3.9	1.5	.12	
21	1	0	16	7	OP-67	11	.0	17.1	42	6.75	.25	9.7	-1.0	4.0	4.3	2.1	12.9	.4	.3	3.8	1.6	.06	
22	1	0	16	7	OP-67	11	7.0	15.8	42	6.79	.13	7.8	-1.0	1.2	4.0	1.4	12.7	.1	.6	3.7	1.6	.12	
23	32	2	29	0	OP-67	12	.0	17.0	43	6.71	.00	9.9	-1.0	-1.0	4.9	2.1	14.1	.1	.7	4.1	1.3	.09	
24	32	2	29	0	OP-67	12	12.0	10.0	45	7.47	.00	9.3	-1.0	-1.0	5.0	1.6	12.6	.1	.8	4.0	1.3	.10	
25	29	7	25	6	OP-67	13	.0	17.2	41	6.56	.00	10.4	-1.0	-1.0	4.7	2.5	13.2	.1	.9	4.2	1.1	.12	
26	29	7	25	6	OP-67	13	7.0	11.0	42	6.55	.00	9.7	-1.0	-1.0	4.9	2.4	12.8	.2	.9	4.0	-1.0	.09	
27	29	0	16	5	OP-67	14	.0	17.0	41	6.54	.00	10.3	-1.0	-1.0	4.5	1.6	13.0	.1	1.3	4.0	1.8	.11	
28	29	0	16	5	OP-67	14	5.0	17.0	41	6.44	.00	10.0	-1.0	-1.0	4.8	1.3	13.2	.2	.8	3.9	.9	.11	
29	34	8	23	5	OP-67	15	.0	17.0	40	6.61	.00	10.6	-1.0	-1.0	3.7	1.7	12.8	.1	.2	3.9	1.3	.07	
30	34	8	23	5	OP-67	15	16.0	6.5	41	7.51	.00	7.5	-1.0	-1.0	3.8	1.5	12.6	.1	.2	3.7	1.5	.07	
31	28	4	31	6	OP-67	16	.0	18.5	41	7.88	.00	8.8	-1.0	4.2	3.3	1.5	13.6	.4	.6	3.7	1.4	.15	
32	28	4	31	6	OP-67	16	3.0	18.2	42	7.24	.00	7.6	-1.0	.3	3.3	2.1	13.8	.1	.6	3.8	1.3	.14	
33	34	8	25	8	OP-67	17	.0	18.0	39	6.56	.00	10.5	-1.0	1.8	4.7	1.7	12.6	.1	.8	4.0	-1.0	.10	
34	34	8	25	8	OP-67	17	5.0	16.0	41	6.43	.00	8.6	-1.0	1.7	5.0	1.7	12.6	.1	.7	3.9	-1.0	.13	
35	22	3	20	3	OP-67	18	.0	16.8	41	6.78	.00	10.6	-1.0	-1.0	4.5	1.7	12.9	.2	.3	4.0	3.6	.07	
36	22	3	20	3	OP-67	18	38.0	13.6	42	6.72	.00	9.5	-1.0	-1.0	4.5	1.8	12.8	.1	1.0	4.1	1.5	.09	
37	18	8	17	7	OP-67	19	.0	18.0	41	6.72	.00	10.3	-1.0	-1.0	4.4	1.4	13.0	.3	1.0	3.8	.2	.18	
38	18	8	17	7	OP-67	19	6.0	17.0	41	6.48	.00	10.3	-1.0	-1.0	4.4	1.2	-1.0	.1	1.0	4.1	1.0	.14	
39	20	9	14	3	OP-67	20	.0	19.0	39	6.67	.00	9.8	-1.0	-1.0	4.1	1.6	12.4	.2	.4	3.8	1.3	.09	
40	20	9	14	2	OP-67	20	3.0	18.8	40	6.52	.00	8.8	-1.0	-1.0	4.1	1.7	13.1	.1	1.8	3.5	1.6	.08	
41	24	6	17	4	OP-67	21	.0	17.0	41	6.63	.00	10.1	-1.0	-1.0	4.5	1.5	12.6	.2	1.1	3.9	1.9	.10	
42	24	6	17	4	OP-67	21	9.0	15.0	40	6.42	.00	9.0	-1.0	-1.0	3.8	1.2	12.7	.6	1.1	3.9	1.6	.13	
43	27	2	20	6	OP-67	22	.0	17.0	40	6.45	.00	11.0	-1.0	.0	4.5	1.7	13.2	.1	.6	3.9	1.5	.11	
44	27	2	20	6	OP-67	22	45.0	7.0	42	6.67	.00	10.2	-1.0	2.1	4.5	1.7	12.4	.1	.7	4.0	3.8	.17	
45	14	1	23	9	OP-67	23	.0	17.0	42	6.72	.00	11.6	-1.0	-1.0	4.5	1.5	12.8	.2	1.1	3.9	1.9	.11	
46	14	1	23	9	OP-67	23	9.0	13.2	43	6.93	.00	8.6	-1.0	-1.0	4.2	2.0	12.6	.1	.9	4.0	1.7	.15	
47	10	8	26	4	OP-67	24	.0	17.5	43	7.12	.00	10.1	-1.0	.0	4.3	2.3	12.4	.1	1.1	4.1	1.4	.17	
48	10	8	26	4	OP-67	24	5.0	16.6	41	6.59	.00	8.4	-1.0	.1	4.2	1.3	12.6	.2	.9	3.9	1.5	.20	
49	4	9	20	4	OP-67	25	.0	16.8	42	6.71	.00	10.3	-1.0	.0	4.3	1.7	12.4	.2	.9	3.9	1.5	.12	
50	4	9	20	4	OP-67	25	9.0	14.2	42	6.73	.90	8.3	-1.0	4.5	4.0	1.8	13.4	.1	1.1	3.8	1.3	.13	
51	7	8	25	8	OP-67	26	.0	18.8	37	6.90	.25	9.4	-1.0	-1.0	4.8	2.1	13.0	.3	.8	3.6	1.5	.15	
52	7	8	25	8	OP-67	26	2.0	18.0	43	7.40	1.83	8.6	-1.0	-1.0	4.9	1.1	12.8	.3	.7	3.8	-1.0	.15	
53	51	0	22	1	OP-67	27	.0	19.0	43	6.38	.37	10.0	-1.0	1.9	5.1	2.5	13.0	.1	1.4	4.0	.9	.15	
54	51	0	22	1	OP-67	27	13.0	1.3	42	6.40	.38	11.0	-1.0	2.2	5.2	1.6	12.9	.4	1.0	4.0	1.7	.13	
55	35	4	23	8	OP-67	28	.0	19.0	42	6.40	.40	8.8	-1.0	2.1	4.9	2.1	12.9	.3	.4	4.0	-1.0	.08	
56	35	4	23	8	OP-67	28	9.0	17.0	42	6.35	.27	9.2	-1.0	3.4	5.4	1.7	13.2	.1	.7	3.8	1.5	.11	
57	32	3	26	3	OP-67	29	.0	18.0	42	6.71	-1.00	10.2	-1.0	-1.0	4.9	1.4	13.0	.2	.6	3.8	1.6	.11	
58	32	3	26	3	OP-67	29	7.0	17.6	42	6.78	.00	7.4	-1.0	-1.0	4.8	1.8	13.2	.1	.8	3.9	1.5	.11	
59	47	0	27	8	OP-67	30	.0	18.8	41	6.67	.00	7.3	-1.0	-1.0	4.8	1.9	12.9	.4	1.2	3.8	.3	.06	
60	47	0	27	8	OP-67	30	5.0	18.8	40	6.60	.00	7.4	-1.0	-1.0	4.8	.8	-1.0	.3	.9	3.9	1.6	.20	
61	54	1	22	6	OP-67	31	.0	18.4	41	6.56	.00	7.0	-1.0	-1.0	4.8	1.4	13.2	.3	-1.0	3.9	1.6	.12	
62	54	1	22	6	OP-67	31	6.0	18.0	41	6.49	.00	10.2	-1.0	-1.0	5.0	1.7	12.8	.1	.5	3.9	1.3	.20	
63	58	6	22	5	OP-67	32	.0	18.0	42	6.41	.00	8.3	-1.0	-1.0	5.0	1.3	13.1	.1	1.1	3.9	1.5	.10	
64	58	6	22	5	OP-67	32	4.0	18.0	42	6.38	.00	8.1	-1.0	-1.0	5.0	1.7	13.2	.3	.5	3.9	1.6	.07	
65	62	3	21	0	OP-67	33	.0	18.0	42	6.45	.00	8.4	-1.0	-1.0	5.0	1.8	13.0	.1	.5	5.8	.9	.52	
66	62	3	21	0	OP-67	33	5.0	18.0	41	6.49	.00	8.0	-1.0	-1.0	5.0	1.4	13.2	.1	1.0	4.2	1.6	.11	
67	71	3	23	5	OP-67	34	.0	18.4	42	6.49	.00	7.4	-1.0	-1.0	5.2	2.3	12.9	.1	1.2	4.0	1.5	.14	
68	71	3	23	5	OP-67	34	10.0	13.5	43	6.46	.00	8.1	-1.0	-1.0	5.8	1.6	13.0	.1	.8	3.9	1.7	.08	
69	71	1	26	9	OP-67	35	.0	17.0	39	6.41	.00	8.8	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.00	
70	71	1	26	9	OP-67	35	6.0	17.0	41	6.28	.00	7.9	-1.0	-1.0	5.0	1.6	12.9	.1	.6	3.8	-1.0	.09	
71	64	9	31	5	OP-67	36	.0	20.0	36	6.47	.00	8.5	-1.0	-1.0	3.3	1.7	13.2	.1	.7	3.1	1.3	.09	
72	64	9	31	5	OP-67	36	6.0	19.0	36	6.46	.00	7.8	-1.0	-1.0	3.5	1.2	13.1	.1	1.0	3.3	-1.0	.08	
73	66	9	33	1	OP-67	37	.0	19.0	39	6.30	.00	8.1	-1.0	-1.0	4.1	1.4	13.4	.2	-1.0	3.7	.8	.09	
74	66	9	31	1	OP-67	37	6.0	16.5	40	6.34	.00	7.2	-1.0	-1.0	4.7	1.3	13.2	.2	1.1	3.7	2.0	.11	
75	70	2	30	1	OP-67	38	.0	18.0	41	6.60	.13	9.9	-1.0	1.0	4.5	2.0	13.5	.1	.3	3.8	2.1	.08	
76	70	2	30	1	OP-67	38	10.0	14.1	41	6.50	.11	8.1	-1.0	1.3	4.5	1.8	12.5	.2	.3	3.6	1.5	.14	
77	76	2	31	8	OP-67	39	.0	19.0	40	6.30	.00	10.1	-1.0	.9	4.1	2.0	12.8	.1	.2	3.9	1.5	.06	
78	76	2	31	8	OP-67	39	5.0	18.6	41	6.42	.00	6.5	-1.0	.7	4.2	1.7	12.8	.1	.3	3.9	1.9	.07	
79	63	9	24	4	OP-67	40	.0	19.0	40	6.49	.00	9.7	-1.0	.3	4.6	1.9	12.8	.1	.2	3.9	1.6	.17	
80	63	9	24	4	OP-67	40	3.0	18.8	42	6.47	.00	7.4	-1.0	1.1	4.5	1.8	12.8	.1	.2	3.7	2.7	.15	
81	56	4	20	8	OP-67	41	.0	19.4	41	6.42	.10	9.4	-1.0	1.0	4.6	1.8	12.8	.2	.2	3.8	-1.0	.18	
82	56	4	20	8	OP-67	41	5.0	18.5	39	6.44	.00	8.0	-1.0	.3	4.8	2.0	14.2	.4	.1	3.8	1.3	.06	
83	75	4	28	7	OP-67	42	.0	20.1	42	6.71	.03	-1.0	-1.0	-1.0	4.1	1.7	11.8	.1	.8	3.9	1.5	.25	
84	75	4	28	7	OP-67	42	6.0	18.0	42	7.28	.15	-1.0	-1.0	-1.0	3.6	1.6	12.0	.1	1.0	3.7	1.8	.17	
85	74	3	23	1	OP-67	43	.0	20.5	42	6.43	.19	-1.0	-1.0	1.5	4.9	1.5	12.6	.1	1.0	4.0	1.9	.20	
86	74	3	23	1	OP-67	43	9.0	14.6	43	6.38	.15	-1.0	-1.0	2.1	5.1	1.6	12.2	.1	1.1	4.2	1.7	.15	
87	72	2	19	6	OP-67	44	.0	21.5	42	6.49	.05	-1.0	-1.0	-1.0	4.9	1.5	12.4	.1	1.0	4.0	1.7	.22	
88	72	2	19	6	OP-67	44	4.0	20.5	42	6.48	.19	-1.0	-1.0	-1.0	4.9	1.9	12.6	.1	.7	4.0	1.5	.18	
89	67	3	17	7	OP-67	45	.0	20.0	42	6.48	.03	-1.0	-1.0	-1.0	5.3	1.8	12.2	.1	.8	4.3	1.6	.19	
90	67	3	17	7	OP-67	45	3.0	20.5	42	6.47	.00	-1.0	-1.0	-1.0	5.0	1.8	12.0	.1	.7	2.1	2.7	.23	
91	71	3	16	3	OP-67	46	.0	20.4	43	6.48	.00	-1.0	-1.0	1.2	5.2	1.9	12.0	.1	.5	4.0	1.7	.23	
92	71	3	16	3	OP-67	46	20.0	12.5	43	6.28	.01	-1.0	-1.0	8.7	5.3	1.8	12.6	.1	1.4	4.2	1.1	.13	

I	LAT		LONG		CRUIS	ST	DEPTH	TEMP	CCN	PH	ALK	O2	PS	PHOS	SIO2	CL	SO4	NA	K	CA	MG	F	STATION COMMENT
	--DEG, MIN*10.--						M	C	MUMHO		MEQ/L	PPM		PPB(P)	PPM	PPM	PPM	PPM	PPM	PPM	PPM	PPM	
93	74	8	16	0	OP-67	47	.0	21.5	43	6.36	.01	-1.0	-1.0	-1.0	5.4	1.8	12.4	.1	.8	4.0	1.8	.18	
94	74	8	16	0	OP-67	47	22.0	10.6	43	6.28	.06	-1.0	-1.0	-1.0	6.3	1.7	13.4	.1	.9	4.2	1.7	.07	
95	76	1	19	5	OP-67	48	.0	21.5	43	6.40	.00	-1.0	-1.0	-1.0	5.0	1.5	12.6	.1	.9	3.4	2.6	.22	
96	76	1	19	5	OP-67	48	6.0	19.4	42	6.31	.00	-1.0	-1.0	-1.0	5.2	1.6	12.4	.1	1.5	3.9	1.7	.19	
97	84	6	15	0	OP-67	49	.0	22.0	45	6.51	.00	-1.0	-1.0	-1.0	5.0	2.3	12.4	.1	1.0	4.3	1.6	.42	
98	84	6	15	0	OP-67	49	5.0	17.2	43	6.32	.00	-1.0	-1.0	-1.0	5.4	1.7	12.0	.1	.7	4.2	1.3	.23	
99	88	4	14	7	OP-67	50	.0	21.7	43	6.32	.01	-1.0	-1.0	1.0	4.7	1.8	13.2	.1	.9	4.4	1.5	.39	
100	88	4	14	7	OP-67	50	8.0	17.0	43	6.40	.00	-1.0	-1.0	1.3	5.6	1.7	12.5	.1	.8	3.6	2.0	.21	
102	58	9	18	5	OP-67	51	3.0	18.0	39	6.10	.11	8.2	-1.0	1.0	5.2	1.6	12.1	.1	.8	1.5	2.8	.44	
103	60	2	15	5	OP-67	52	.0	20.0	37	6.64	.09	9.0	-1.0	1.3	4.9	1.4	12.1	.1	.8	3.0	1.8	.35	
104	60	2	15	5	OP-67	52	32.0	6.5	42	5.83	.12	8.0	-1.0	13.0	5.8	1.6	11.2	.1	1.4	3.3	1.6	.21	
105	65	2	15	4	OP-67	53	.0	20.0	37	6.52	.19	9.1	-1.0	-1.0	4.8	1.6	11.7	.1	.9	3.4	1.5	.20	
106	65	2	15	4	OP-67	53	9.0	10.0	42	5.81	.17	4.6	-1.0	-1.0	6.6	1.7	12.4	.1	1.1	3.2	-1.0	.07	
107	67	6	6	6	OP-67	54	.0	20.5	36	6.70	.11	8.5	-1.0	2.5	4.7	1.7	13.0	.1	.8	3.6	1.6	.21	
108	67	6	6	6	OP-67	54	7.0	15.8	39	5.89	.12	6.9	-1.0	2.1	5.6	1.6	12.7	.1	1.1	3.2	1.8	.29	
109	65	1	15	3	OP-67	55	.0	21.0	37	6.60	.17	9.4	-1.0	-1.0	4.9	1.7	12.5	.1	.8	3.4	1.4	.29	
110	65	1	15	3	OP-67	55	14.0	10.5	42	5.93	.13	9.3	-1.0	-1.0	5.7	1.5	12.1	.1	1.0	3.6	1.7	.20	
111	80	1	19	2	OP-67	56	.0	20.5	40	6.59	.12	9.2	-1.0	-1.0	4.9	1.8	12.2	.1	.7	3.9	1.6	.14	
112	80	1	19	2	OP-67	56	2.0	20.0	40	6.60	.03	7.3	-1.0	-1.0	5.0	1.7	12.0	.1	1.6	2.6	2.8	.20	
113	80	4	24	5	OP-67	57	.0	23.0	36	6.29	.17	8.3	-1.0	1.7	4.6	1.6	12.0	.1	1.0	3.3	1.8	.23	
114	80	4	24	5	OP-67	57	7.0	13.0	39	5.73	.12	5.7	-1.0	12.8	5.7	1.5	12.2	.1	.6	3.2	-1.0	.12	
115	78	8	15	7	OP-67	58	.0	20.4	40	6.65	.08	9.4	-1.0	-1.0	5.2	1.9	12.4	.1	1.0	4.0	1.9	.20	
116	78	8	15	7	OP-67	58	4.0	19.3	39	6.61	.06	7.9	-1.0	-1.0	5.1	1.7	12.5	.1	1.3	4.1	1.9	.30	
117	80	5	13	7	OP-67	59	.0	20.5	42	6.59	.06	9.2	-1.0	.9	4.9	1.8	11.7	.1	.7	4.2	1.6	.25	
118	80	5	13	7	OP-67	59	16.0	10.0	44	6.20	.09	8.3	-1.0	.5	6.0	1.8	12.4	.1	1.0	4.2	1.4	.19	
119	95	8	11	9	OP-67	60	.0	21.2	42	6.56	.19	8.8	-1.0	1.0	4.9	1.9	12.5	.1	.8	4.2	1.9	.23	
120	95	8	11	9	OP-67	60	9.0	13.1	44	6.19	.15	7.1	-1.0	4.7	5.6	1.9	12.5	.1	1.2	3.4	2.1	.25	
121	92	6	13	2	OP-67	61	.0	22.7	45	6.28	.05	-1.0	-1.0	.6	4.9	1.9	13.4	.1	.8	4.4	1.5	.32	
122	92	6	13	2	OP-67	61	6.0	20.0	43	6.36	.00	-1.0	-1.0	2.0	5.6	1.7	12.6	.1	1.3	3.6	2.1	.48	
123	98	4	15	8	OP-67	62	.0	21.2	42	6.66	.13	8.8	-1.0	1.0	5.0	1.6	11.6	.1	.9	4.4	1.6	.37	
124	98	4	15	8	OP-67	62	2.0	19.5	40	6.23	.13	6.2	-1.0	1.5	4.7	1.6	12.0	.1	.5	4.3	1.6	.14	
125	99	7	11	8	OP-67	63	.0	21.6	42	6.81	.15	8.8	-1.0	-1.0	4.7	2.0	12.7	.1	.6	4.3	1.6	.20	
126	99	7	11	8	OP-67	63	5.0	17.8	42	6.23	.16	6.7	-1.0	-1.0	5.1	1.7	12.2	.1	.8	4.1	1.7	.24	
127	102	3	9	3	OP-67	64	.0	20.0	41	6.36	.03	9.0	-1.0	1.3	4.8	2.7	12.4	.1	.7	4.0	1.7	.54	
128	102	3	9	3	OP-67	64	6.0	18.5	42	6.30	.03	7.9	-1.0	.7	4.8	1.9	-1.0	.1	1.1	4.2	1.7	.29	
129	125	1	5	1	OP-67	65	.0	20.2	37	6.39	.00	-1.0	-1.0	.9	4.5	2.0	11.4	.1	1.1	3.2	2.2	.18	
130	125	1	5	1	OP-67	65	2.0	20.2	36	6.45	.00	-1.0	-1.0	1.1	4.4	1.8	12.0	.1	1.1	4.0	1.7	.22	
131	121	6	5	8	OP-67	66	4.0	20.5	39	6.63	.00	-1.0	-1.0	2.5	4.5	1.9	12.1	.1	.8	3.9	1.6	.26	
132	121	6	5	8	OP-67	66	.0	19.8	39	6.48	.00	-1.0	-1.0	2.6	4.7	1.7	12.2	.1	1.3	4.1	1.6	.23	
133	118	C	6	6	OP-67	67	.0	19.2	39	6.25	.00	-1.0	-1.0	-1.0	4.7	1.8	12.6	.1	1.2	3.9	1.6	.26	
134	118	0	6	6	OP-67	67	7.0	14.9	39	6.29	.00	-1.0	-1.0	-1.0	5.2	1.7	12.3	.1	.8	3.9	1.7	.32	
135	113	3	7	6	OP-67	68	.0	19.4	39	6.31	.00	-1.0	-1.0	-1.0	4.8	2.2	12.7	.1	.8	3.9	1.6	.20	
136	113	3	7	6	OP-67	68	3.0	19.4	39	6.27	.00	-1.0	-1.0	-1.0	4.6	1.7	12.9	.1	.9	3.8	1.9	.25	
137	110	5	8	6	OP-67	69	.0	21.0	39	6.41	.00	-1.0	-1.0	-1.0	5.0	2.0	12.7	.1	.7	3.9	1.8	.23	
138	110	5	8	6	OP-67	69	4.0	20.2	39	6.54	.01	-1.0	-1.0	-1.0	4.8	1.9	12.8	.1	1.1	4.1	1.5	.28	
139	106	6	11	0	OP-67	70	.0	20.4	41	6.42	.05	-1.0	-1.0	1.3	4.6	2.1	12.8	.1	.8	5.0	1.3	.23	
140	106	6	11	0	OP-67	70	4.0	20.2	41	6.42	.00	-1.0	-1.0	1.0	4.7	1.8	12.6	.1	1.1	4.4	1.6	.28	
141	104	0	13	2	OP-67	71	.0	20.0	40	6.43	.01	-1.0	-1.0	11.0	4.7	2.1	12.6	.1	.8	4.2	1.6	.19	
142	104	0	13	2	OP-67	71	4.0	19.2	40	6.41	.02	-1.0	-1.0	1.4	4.7	1.8	12.9	.2	1.1	4.2	1.6	.23	
143	8	5	15	9	OP-67	1	-.0	23.0	-1	6.31	2.08	-1.0	-1.0	-1.0	21.2	2.9	-1.0	1.9	1.6	5.4	3.5	.65	CORE
144	8	5	15	9	OP-67	1	-4.0	23.0	-1	6.68	2.34	-1.0	-1.0	-1.0	38.4	2.9	-1.0	3.3	2.4	16.8	5.6	.37	CORE
145	8	5	15	9	OP-67	1	-.0	13.0	-1	5.63	2.03	-1.0	-1.0	-1.0	10.1	1.1	-1.0	1.0	.4	3.3	1.6	.04	CORE
146	60	2	15	5	OP-67	3	-.0	23.0	-1	6.65	2.87	-1.0	-1.0	-1.0	26.4	2.8	-1.0	2.5	2.3	5.6	1.8	.13	CORE
147	60	2	15	5	OP-67	3	-6.0	24.6	-1	6.60	2.52	-1.0	-1.0	-1.0	32.7	6.3	-1.0	4.1	8.0	27.5	7.3	1.90	CORE
148	60	2	15	5	OP-67	3	-.0	16.5	-1	5.97	.39	-1.0	-1.0	-1.0	14.6	1.4	-1.0	.9	.6	4.9	1.8	.04	CORE

WHEN NOTE=1, IONIC STRENGTH CALCULATED FROM CONDUCTIVITY. =2, IONIC STRENGTH ASSUMED ZERO. =3, IONIC STRENGTH GREATER THAN .005.
WHEN A SATURATION IS NEGATIVE, UNDERSATURATION OCCURS. WHEN POSITIVE, SUPERSATURATION./

LAKE AGNEW SUMMER 1967 A-671

I	LAT --DEG,		LONG MIN*10.--		CRUIS	ST	DEPTH M	TEMP C	CON MUMHO	PH	ALK MEQ/L	O2 PPM	PS	PHOS PPB(P)	SIO2 PPM	CL PPM	SO4 PPM	NA PPM	K PPM	CA PPM	MG PPM	F PPM	STATION COMMENT
1	-0	-0	-0	-0	A-671	1	.0	18.0	45	6.79	.15	8.6	-1.0	-1.0	5.8	1.2	10.2	1.4	.2	5.4	1.5	.05	GRANITE
2	-0	-0	-0	-0	A-671	2	.0	18.5	44	6.87	.20	8.6	-1.0	-1.0	5.8	1.2	10.0	1.5	.0	5.3	1.7	.05	GRANITE
3	-0	-0	-0	-0	A-671	2	4.6	17.5	42	6.97	.24	8.5	-1.0	-1.0	5.9	1.4	9.8	1.7	.0	5.3	1.3	.05	GRANITE
4	-0	-0	-0	-0	A-671	3	.0	18.5	36	6.72	.20	8.4	-1.0	-1.0	3.9	6.5	7.3	1.6	.1	4.1	1.9	.05	GRANITE GABBRO
5	-0	-0	-0	-0	A-671	4	.0	18.8	42	6.97	.21	7.8	-1.0	-1.0	5.9	1.5	10.1	1.4	.2	5.7	1.6	.07	GABBRO
6	-0	-0	-0	-0	A-671	5	.0	19.8	47	6.87	.27	7.6	-1.0	-1.0	5.5	1.4	10.1	1.4	.1	5.5	1.5	.09	
7	-0	-0	-0	-0	A-671	5	8.8	17.8	46	6.95	.29	7.8	-1.0	-1.0	6.1	1.7	10.1	1.6	.1	4.8	2.3	.05	
8	-0	-0	-0	-0	A-671	6	.0	22.2	46	6.86	.20	8.2	-1.0	-1.0	5.3	1.9	10.2	1.9	.0	5.5	2.3	.07	GABBRO
9	-0	-0	-0	-0	A-671	7	.0	21.8	44	6.79	.19	7.5	-1.0	-1.0	5.2	1.9	10.3	1.7	.4	5.4	1.7	.08	GABBRO
10	-0	-0	-0	-0	A-671	8	.0	20.6	45	7.06	.19	7.5	-1.0	-1.0	4.9	1.4	7.6	1.4	.0	5.3	.6	.06	GRANITE
11	-0	-0	-0	-0	A-671	8	11.8	19.7	49	7.19	.22	5.8	-1.0	-1.0	5.2	1.8	9.5	1.3	.1	5.4	1.5	.06	GRANITE
12	-0	-0	-0	-0	A-671	9	.0	20.8	47	7.08	.21	5.0	-1.0	-1.0	4.7	1.4	8.8	1.5	.0	5.5	1.7	.06	DIABASE
13	-0	-0	-0	-0	A-671	9	6.4	20.0	50	7.05	.19	5.5	-1.0	-1.0	4.6	1.1	10.0	1.5	.3	5.1	2.1	.09	DIABASE
14	-0	-0	-0	-0	A-671	10	.0	21.0	44	6.58	.16	6.8	-1.0	-1.0	4.4	1.0	10.2	1.3	.1	5.0	1.6	.06	GRANITE

WHEN NOTE=1, IONIC STRENGTH CALCULATED FROM CONDUCTIVITY. =2, IONIC STRENGTH ASSUMED ZERO. =3, IONIC STRENGTH GREATER THAN .005.
WHEN A SATURATION IS NEGATIVE, UNDERSATURATION OCCURS. WHEN POSITIVE, SUPERSATURATION./

(d) A very marked increase (about 10 times) in orthophosphate concentration takes place at 0.5-1.0 meter above the bottom.

(e) Interstitial waters are higher in orthophosphate (10x), silica (10-100x), more acid (pH 5-7) than lake waters. They appear to be a closed system compared to the lake.

EQUILIBRIA CALCULATIONS

Calculations involving equilibria with respect to dissolved oxygen (percent saturation), carbon dioxide (equilibrium partial pressure of carbon dioxide), saturation of water with respect to $CaCO_3$, $CaMg(CO_3)_2$, $Ca_{10}(PO_4)_6(OH)_2$, and with respect to alumino-silicates were carried out. A computer program (Appendix I) was used to make all calculations, and make various graphical displays. The following tables are calculations of the raw data presented above. The numbers (I) are the same as for the raw data. The next five columns involve calculations involving carbonates (variables pH, alkalinity, Ca^{+2}, Mg^{+2}). The first two columns are for $CaCO_3$. The first column (pK) is the negative logarithm of the apparent ion product:

$$pK = -\log_{10} (Ca^{+2})(CO_3^{=})$$

The next column is the logarithmic difference of the saturation. Negative values represent unsaturation, positive values supersaturation. A string of 9's represents lack of data for calculation. The next two columns are the equivalent columns for $CaMg(CO_3)_2$. The next column (PPCO2) is the negative logarithm of the equilibria partial pressure of carbon dioxide.

$$PPCO2 = -\log_{10} (P_{co_2})$$

Atmospheric equilibrium would give a value of 3.5. The next two columns are the saturation columns with respect to $Ca_{10}(PO_4)_6(OH)_2$(OH-apatite).

The next two columns represent the calculated ionic strength and ionic strength calculated from conductivity assuming a linear relationship. Ionic strength is the basis of activity calculations and is calculated from the relationship:

$$\mu = \frac{1}{2} \sum_i c_i z_i^2$$

where μ is ionic strength, c_i is the molar concentration of ith ion, and z_i is the valence of the ith ion.

The next three columns PN/H, PK/H, and PSI involve variables related to alumino-silicate equilbria and are:

$$PN/H = -\log_{10}\frac{(Na^+)}{(H^+)}$$

$$PK/H = -\log_{10}\frac{(K^+)}{(H^+)}$$

$$PSI = -\log_{10}(H_4SiO_4)$$

The next column (O2 SAT) is the saturation of oxygen with respect to air and is expressed in percent.

The next column EHROX is the redox potential (volts) calculated from pH and O_2:

$$\frac{1}{4}O_2 + H^+ + e^- = \frac{1}{2}H_2O$$

where

$$EHROX = E_o - \frac{RT}{F}\log(H^+) - \frac{1}{4}\frac{RT}{F}\log Po_2$$

where R is the gas constant, T is the temperature (°K), F is the Faraday constant, E_o is the half cell potential, and Po_2 is the partial pressure of oxygen (atmospheres). EHROX can be compared directly to measured Eh values.

EHSSO was intended to be the Eh calculated from $SO_4^=$, $S^=$, and pH measurements:

$$S^= + 4H_2O = SO_4^= + 8H^+ + 8e^-$$

Since $S^=$ was not measured, these calculations were not carried out.

IEL is an approximate check on overall reproducibility of analytical data as it checks the deviation from electroneutrality:

$$IEL = \frac{[\Sigma(+)-\Sigma(-)]100}{\Sigma(+)}$$

where $\Sigma(+)$ represents all the positive charges and $\Sigma(-)$ all the negative charges.

Analyses of the resulting equilibria data are:

(1) Lake Erie is deficient in oxygen and has excess CO_2.

(2) Non-carbonate terrane lakes have excess CO_2 but sufficient O_2.

(3) Carbonate terrane lakes (Erie and Ontario) are saturated with respect

LAKE ERIE PTE. DAUPHINE 8/22-26/66. SYNOPTLC + CORE + SI + PHOS.-JCS+PS

I	CACO3 PK	CACO3 SAT	CAMG(CO3)2 PK	CAMG(CO3)2 SAT	PPCO2 ATM	OHAP PK	OHAP SAT	IONIC STRENGTH IONS M/L	IONIC STRENGTH COND M/L	PN/H	PK/H	PSI M/L	O2 SAT 0/0 EHROX VOLTS EHSSO VOLTS	IEL 0/0	NOTES
1	7.97	.39	16.29	.86	3.45	110.21	3.88	.00337	.00000	-1.00	-1.00	-1.00	-19999.009999.00	-7	0 0 0
2	8.13	.18	16.56	.43	3.35	116.73	-3.05	.00338	.00000	-1.00	-1.00	-1.00	-19999.009999.00	-7	0 0 0
3	8.17	.14	16.70	.29	3.32	113.84	-.17	.00330	.00000	-1.00	-1.00	-1.00	-19999.009999.00	-6	0 0 0
4	8.10	.20	16.55	.45	3.41	115.55	-1.88	.00333	.00000	-1.00	-1.00	-1.00	-19999.009999.00	-5	0 0 0
5	8.13	.17	16.60	.40	3.37	114.86	-1.18	.00345	.00000	-1.00	-1.00	-1.00	-19999.009999.00	-6	0 0 0
6	8.09	.23	16.55	.48	3.36	115.50	-1.73	.00349	.00000	-1.00	-1.00	-1.00	-19999.009999.00	-7	0 0 0
7	8.09	.24	16.49	.58	3.33	113.62	.24	.00350	.00000	-1.00	-1.00	-1.00	-19999.009999.00	-9	0 0 0
8	8.05	.29	16.45	.65	3.36	114.44	-.49	.00356	.00000	-1.00	-1.00	-1.00	-19999.009999.00	-8	0 0 0
9	8.36	-.03	17.09	-.03	3.01	109.80	4.05	.00374	.00364	4.42	3.44	4.50	-19999.009999.00	-10	0 0 0
10	8.43	-.09	17.22	-.15	2.96	109.65	4.20	.00362	.00366	4.36	3.36	4.48	90 .789999.00	-12	0 0 0
11	8.04	.29	16.44	.62	3.34	109.87	3.99	.00398	.00395	4.90	3.83	4.52	-19999.009999.00	-8	0 0 0
12	8.17	.16	16.74	.33	3.25	108.77	5.08	.00388	.00410	4.80	3.66	4.48	100 .769999.00	-8	0 0 0
13	7.91	.42	16.18	.89	3.55	110.57	3.29	.00394	.00395	5.05	3.90	4.70	-19999.009999.00	-7	0 0 0
14	9.27	-.89	18.90	-1.70	1.97	-1.009999.00		.00398	.00395	3.58	2.46	4.66	111 .819999.00	-12	0 0 0
15	-1.009999.00		-1.009999.00		3.60	-1.009999.00		.00000	.00408	-1.00	-1.00	-1.00	-19999.009999.00	9999	1 0 0
16	7.83	.51	16.01	1.09	3.63	112.91	1.03	.00390	.00386	5.09	4.02	4.88	-19999.009999.00	-5	0 0 0
17	7.74	.61	15.88	1.22	3.66	113.56	.39	.00394	.00388	5.16	4.07	4.88	110 .739999.00	-12	0 0 0
18	7.68	.66	15.76	1.34	3.59	114.23	-.28	.00479	.00474	-1.00	-1.00	-1.00	-19999.009999.00	-11	0 0 0
19	7.69	.66	15.83	1.27	3.59	114.18	-.23	.00492	.00490	-1.00	-1.00	-1.00	102 .739999.00	-8	0 0 0
20	7.80	.52	16.02	1.01	3.49	115.74	-1.97	.00486	.00485	5.17	4.04	5.48	-19999.009999.00	-4	0 0 0
21	7.71	.61	15.79	1.24	3.59	115.87	-2.11	.00491	.00489	5.26	4.12	5.30	109 .759999.00	-6	0 0 0
22	7.89	.44	16.21	.86	3.39	115.50	-1.64	.00486	.00478	5.07	3.97	5.08	-19999.009999.00	-3	0 0 0
23	7.75	.58	15.94	1.13	3.60	114.72	-.87	.00471	.00478	5.24	4.06	5.30	101 .749999.00	-3	0 0 0
24	7.90	.42	16.21	.82	3.40	116.68	-2.91	.00493	.00478	-1.00	-1.00	-1.00	-19999.009999.00	-3	0 0 0
25	7.95	.37	16.28	.75	3.30	115.78	-2.01	.00487	.00478	-1.00	-1.00	-1.00	-19999.009999.00	-10	0 0 0
26	7.95	.36	16.28	.71	3.62	115.20	-1.52	.00452	.00472	-1.00	-1.00	-1.00	-19999.009999.00	9	0 0 0
27	7.92	.39	16.23	.77	3.35	114.57	-.89	.00498	.00490	-1.00	-1.00	-1.00	-19999.009999.00	-4	0 0 0
28	7.84	.47	16.06	.94	3.47	114.53	-.85	.00499	.00481	-1.00	-1.00	-1.00	-19999.009999.00	-1	0 0 0
29	8.62	-.31	17.64	-.64	2.51	119.23	-5.55	.00000	.00476	-1.00	-1.00	-1.00	-19999.009999.00	9999	1 0 0
30	8.80	-.49	18.02	-1.02	2.25	117.42	-3.74	.00516	.00509	-1.00	-1.00	-1.00	-19999.009999.00	-15	0 0 3
31	7.94	.37	16.29	.71	3.24	114.84	-1.16	.00497	.00485	-1.00	-1.00	-1.00	-19999.009999.00	-14	0 0 0
32	7.87	.45	16.15	.88	3.28	117.10	-3.33	.00492	.00000	-1.00	-1.00	-1.00	-19999.009999.00	-14	0 0 0
33	7.93	.29	16.30	.45	3.34	118.40	-5.35	.00505	.00000	-1.00	-1.00	-1.00	89 .819999.00	-12	0 0 3
34	8.21	.08	16.79	.17	3.34	113.64	-.05	.00464	.00000	-1.00	-1.00	-1.00	-19999.009999.00	9	0 0 0
35	8.63	-.55	17.69	-1.29	2.67	115.87	-3.73	.00000	.00000	-1.00	-1.00	-1.00	71 .919999.00	9999	0 2 0
36	8.94	-.85	18.29	-1.89	2.85	107.83	4.31	.00000	.00000	-1.00	-1.00	-1.00	-19999.009999.00	9999	0 2 0
37	8.86	-.77	18.13	-1.73	2.79	110.50	1.64	.00000	.00000	-1.00	-1.00	-1.00	-19999.009999.00	9999	0 2 0
38	7.74	.61	15.88	1.22	3.66	113.56	.39	.00394	.00388	5.16	4.07	5.08	109 .739999.00	-12	0 0 0
39	7.80	.52	16.02	1.01	3.49	115.74	-1.97	.00486	.00485	5.17	4.04	5.18	-19999.009999.00	-4	0 0 0
40	8.62	-.45	17.80	-1.19	1.98	-1.009999.00		.00000	.00000	3.97	2.93	3.78	-19999.009999.00	9999	0 2 0
41	9.28	-1.12	18.99	-2.38	1.37	-1.009999.00		.00000	.00000	3.42	2.79	3.48	-19999.009999.00	9999	0 2 0
42	7.97	.39	16.29	.86	3.45	110.05	4.03	.00337	.00000	-1.00	-1.00	-1.00	-19999.009999.00	-7	0 0 0
43	8.13	.18	16.56	.43	3.35	117.48	-3.80	.00338	.00000	-1.00	-1.00	-1.00	-19999.009999.00	-7	0 0 0
44	8.17	.14	16.70	.29	3.32	115.65	-1.97	.00330	.00000	-1.00	-1.00	-1.00	-19999.009999.00	-6	0 0 0
45	8.10	.20	16.55	.45	3.41	117.94	-4.26	.00333	.00000	-1.00	-1.00	-1.00	-19999.009999.00	-5	0 0 0
46	8.13	.17	16.60	.40	3.37	116.66	-2.98	.00345	.00000	-1.00	-1.00	-1.00	-19999.009999.00	-6	0 0 0
47	8.09	.23	16.55	.48	3.36	118.36	-4.59	.00349	.00000	-1.00	-1.00	-1.00	-19999.009999.00	-7	0 0 0
48	8.09	.24	16.49	.58	3.33	117.23	-3.37	.00350	.00000	-1.00	-1.00	-1.00	-19999.009999.00	-9	0 0 0
49	8.05	.29	16.45	.65	3.36	116.83	-2.88	.00356	.00000	-1.00	-1.00	-1.00	-19999.009999.00	-8	0 0 0
50	8.36	-.03	17.09	-.03	3.01	110.78	3.08	.00374	.00364	4.42	3.44	4.50	-19999.009999.00	-10	0 0 0
51	8.43	-.09	17.22	-.15	2.96	110.67	3.18	.00362	.00366	4.36	3.36	4.48	90 .789999.00	-12	0 0 0
52	8.04	.29	16.44	.62	3.34	110.39	3.47	.00398	.00395	4.90	3.83	4.52	-19999.009999.00	-8	0 0 0
53	8.17	.16	16.74	.33	3.25	109.81	4.04	.00388	.00410	4.80	3.66	4.48	100 .769999.00	-8	0 0 0
54	7.83	.51	16.01	1.09	3.63	116.18	-2.23	.00390	.00386	5.09	4.02	4.88	-19999.009999.00	-5	0 0 0
55	7.74	.61	15.88	1.22	3.66	114.96	-1.02	.00394	.00388	5.16	4.07	4.88	110 .739999.00	-12	0 0 0
56	7.68	.66	15.76	1.34	3.59	116.04	-2.09	.00479	.00474	-1.00	-1.00	-1.00	-19999.009999.00	-11	0 0 0
57	7.69	.66	15.83	1.27	3.59	115.51	-1.56	.00492	.00490	-1.00	-1.00	-1.00	-19999.009999.00	-8	0 0 0
58	7.80	.52	16.02	1.01	3.49	116.80	-3.03	.00486	.00485	5.17	4.04	5.48	-19999.009999.00	-4	0 0 0
59	7.75	.58	15.94	1.13	3.60	120.14	-6.29	.00471	.00478	5.24	4.06	5.30	101 .749999.00	-3	0 0 0
60	7.95	.37	16.28	.75	3.30	117.26	-3.49	.00487	.00478	-1.00	-1.00	-1.00	-19999.009999.00	-10	0 0 0
61	7.95	.36	16.28	.71	3.62	116.26	-2.58	.00452	.00472	-1.00	-1.00	-1.00	-19999.009999.00	9	0 0 0
62	7.92	.39	16.23	.77	3.35	115.42	-1.75	.00498	.00490	-1.00	-1.00	-1.00	-19999.009999.00	-4	0 0 0
63	7.84	.47	16.06	.94	3.47	115.31	-1.64	.00499	.00481	-1.00	-1.00	-1.00	-19999.009999.00	-1	0 0 0
64	7.94	.37	16.29	.71	3.24	116.64	-2.97	.00497	.00485	-1.00	-1.00	-1.00	-19999.009999.00	-14	0 0 0
65	7.87	.45	16.15	.88	3.28	117.85	-4.08	.00492	.00000	-1.00	-1.00	-1.00	-19999.009999.00	-14	0 0 0
66	8.21	.08	16.79	.17	3.34	115.44	-1.86	.00464	.00000	-1.00	-1.00	-1.00	-19999.009999.00	9	0 0 0
67	8.86	-.77	18.13	-1.73	2.79	115.69	-3.55	.00000	.00000	-1.00	-1.00	-1.00	71 .919999.00	9999	0 2 0
68	8.78	-.77	18.13	-1.94	2.03	114.52	-2.92	.00000	.00000	-1.00	-1.00	-1.00	-19999.009999.00	9999	0 2 0

WHEN NOTE=1, IONIC STRENGTH CALCULATED FROM CONDUCTIVITY.=2, IONIC STRENGTH ASSUMED ZERO.=3, IONIC STRENGTH GREATER THAN .005.
WHEN A SATURATION IS NEGATIVE, UNDERSATURATION OCCURS. WHEN POSITIVE SUPERSATURATION./

E-66-06 PTC DAUPHINE 11/14/66 SAMPLES NORMALLY NOT FILTERED DEPTH-TEMP G

I	CACO3 PK	CACO3 SAT	CAMG(CO3)2 PK	CAMG(CO3)2 SAT	PPCO2 ATM	OHAP PK	OHAP SAT	IONIC STRENGTH IONS M/L	IONIC STRENGTH COND M/L	PN/H	PK/H	PSI M/L	O2 SAT O/O	EHROX VOLTS	EHSSO VOLTS	IEL O/O	NOTES
1	8.08	.06	16.55	-.03	3.16	115.46	-3.00	.00000	.00000	4.86	3.69	5.08	-19999.009999.00			9999	0 2 0
2	7.39	.76	15.14	1.42	3.93	116.92	-4.35	.00000	.00000	5.59	4.42	5.30	-19999.009999.00			9999	0 2 0
3	7.68	.47	15.76	.81	3.73	114.95	-2.37	.00000	.00000	5.39	4.20	5.18	-19999.009999.00			9999	0 2 0
4	7.78	.37	16.00	.57	3.42	115.38	-2.80	.00000	.00000	5.18	3.99	5.18	-19999.009999.00			9999	0 2 0
5	8.03	.12	16.47	.11	3.16	116.17	-3.58	.00000	.00000	-1.00	-1.00	-1.00	-19999.009999.00			9999	0 2 0
6	7.91	.24	16.26	.30	3.39	115.09	-2.54	.00000	.00000	-1.00	-1.00	-1.00	-19999.009999.00			9999	0 2 0
7	8.06	.08	16.52	.02	3.42	115.19	-2.69	.00491	.00000	-1.00	-1.00	-1.00	-19999.009999.00			-2	0 0 0
8	8.13	-.01	16.79	-.28	3.21	115.21	-2.78	.00486	.00000	-1.00	-1.00	-1.00	86	.869999.00		-19	0 0 0
9	8.35	-.22	17.12	-.61	3.03	115.59	-3.16	.00491	.00479	4.67	3.52	5.08	76	.879999.00		-4	0 0 0
10	8.15	-.02	16.77	-.27	3.14	113.58	-1.17	.00501	.00465	-1.00	-1.00	-1.00	94	.869999.00		-10	0 0 3
11	8.00	.12	16.43	.07	3.42	115.57	-3.15	.00485	.00000	-1.00	-1.00	-1.00	-19999.009999.00			-3	0 0 0
12	8.16	-.03	16.63	-.12	3.29	-1.009999.00		.00492	.00000	4.92	3.72	5.00	-19999.009999.00			-4	0 0 0
13	8.12	.02	16.69	-.14	3.20	115.44	-2.92	.00493	.00507	4.88	3.67	5.18	79	.859999.00		-7	0 0 0
14	8.24	-.12	16.90	-.39	3.20	113.80	-1.37	.00490	.00496	4.84	3.66	5.18	86	.869999.00		-5	0 0 0
15	8.04	.10	16.50	.02	3.38	116.10	-3.64	.00486	.00496	5.01	3.85	5.08	84	.859999.00		-2	0 0 0
16	8.13	.00	16.69	-.16	3.27	115.80	-3.34	.00490	.00000	-1.00	-1.00	-1.00	81	.859999.00		-10	0 0 0
17	8.19	-.06	16.73	-.20	3.28	114.90	-2.41	.00485	.00507	4.89	3.73	5.08	90	.859999.00		-5	0 0 0
18	8.53	-.40	17.46	-.94	2.92	116.21	-3.76	.00487	.00483	4.53	3.38	5.18	84	.889999.00		-9	0 0 0
19	8.27	-.14	16.94	-.42	3.20	116.72	-4.26	.00509	.00483	4.80	3.65	5.30	84	.869999.00		-20	0 0 3
20	8.07	.07	16.56	-.00	3.33	115.04	-2.50	.00493	.00000	4.96	3.77	5.08	-19999.009999.00			-12	0 0 0
21	8.16	-.02	16.74	-.19	3.24	114.85	-2.33	.00482	.00000	4.87	3.68	5.08	-19999.009999.00			-5	0 0 0
22	8.29	-.15	16.94	-.40	3.22	115.12	-2.62	.00464	.00000	4.81	3.63	5.00	-19999.009999.00			-2	0 0 0
23	8.55	-.40	17.51	-.95	2.88	116.12	-3.56	.00493	.00000	-1.00	-1.00	-1.00	-19999.009999.00			-8	0 0 0
24	8.38	-.23	17.18	-.61	3.11	113.52	-.94	.00483	.00000	4.77	3.54	4.93	-19999.009999.00			-1	0 0 0
25	8.35	-.20	17.13	-.56	3.13	113.29	-.72	.00493	.00000	4.79	3.57	5.00	-19999.009999.00			-10	0 0 0
26	8.14	.01	16.64	-.06	3.13	115.36	-2.77	.00000	.00000	4.84	3.65	5.08	-19999.009999.00			9999	0 2 0
27	8.05	.11	16.50	.08	3.25	114.94	-2.34	.00000	.00000	4.92	3.72	5.18	-19999.009999.00			9999	0 2 0
28	8.11	.05	16.71	-.10	3.36	113.78	-1.10	.00488	.00000	4.97	3.79	5.08	-19999.009999.00			-5	0 0 0
29	8.21	-.02	16.86	-.18	3.22	113.76	-.90	.00489	.00000	4.85	3.67	5.18	-19999.009999.00			-7	0 0 0
30	8.09	.04	16.61	-.07	3.30	115.74	-3.24	.00475	.00000	4.93	3.75	5.18	-19999.009999.00			-6	0 0 0
31	8.19	-.06	16.80	-.29	3.27	115.78	-3.35	.00470	.00485	4.87	3.70	5.08	87	.869999.00		-10	0 0 0
32	8.05	.08	16.50	.01	3.24	-1.009999.00		.00000	.00000	4.90	3.73	5.08	-19999.009999.00			9999	0 2 0
33	8.26	-.12	16.89	-.35	3.18	115.02	-2.51	.00486	.00000	4.80	3.61	5.18	-19999.009999.00			-9	0 0 0
34	8.30	-.15	17.01	-.45	3.12	114.89	-2.35	.00472	.00000	4.74	3.59	5.18	-19999.009999.00			-2	0 0 0
35	8.25	-.10	16.92	-.37	3.23	115.82	-3.27	.00463	.00000	4.82	3.64	5.08	-19999.009999.00			1	0 0 0
36	8.29	-.14	17.00	-.43	3.04	115.33	-2.75	.00524	.00496	4.71	3.55	5.18	90	.869999.00		-27	0 0 3
37	8.16	-.01	16.75	-.18	3.22	-1.009999.00		.00480	.00492	4.86	3.67	5.18	86	.859999.00		-5	0 0 0
38	8.30	-.16	16.95	-.40	3.27	-1.009999.00		.00424	.00000	-1.00	-1.00	-1.00	-19999.009999.00			-30	0 0 0
39	8.20	-.05	16.71	-.14	3.28	115.34	-2.76	.00490	.00000	4.87	3.68	5.18	-19999.009999.00			5	0 0 0
40	8.10	.05	16.62	-.05	3.32	116.23	-3.64	.00475	.00000	-1.00	-1.00	-1.00	-19999.009999.00			-7	0 0 0
41	8.02	.12	16.39	.15	3.48	115.77	-3.25	.00490	.00000	5.06	3.87	5.30	-19999.009999.00			-1	0 0 0
42	8.29	-.17	17.03	-.54	3.31	115.14	-2.78	.00412	.00000	4.84	3.66	5.00	-19999.009999.00			-15	0 0 0
43	8.16	-.05	16.68	-.21	3.39	113.72	-1.41	.00444	.00000	4.94	3.80	4.93	-19999.009999.00			-10	0 0 0
44	8.44	-.33	17.23	-.77	3.14	114.48	-2.18	.00446	.00000	-1.00	-1.00	-1.00	-19999.009999.00			-9	0 0 0
45	8.46	-.35	17.33	-.87	3.16	112.62	-.33	.00405	.00000	-1.00	-1.00	-1.00	-19999.009999.00			-10	0 0 0
46	-1.009999.00		-1.009999.00		3.05	-1.009999.00		.00000	.00415	-1.00	-1.00	-1.00	84	.889999.00		9999	1 0 0
47	8.30	-.20	16.96	-.52	3.30	113.14	-.89	.00442	.00467	4.87	3.69	5.08	88	.879999.00		-6	0 0 0
48	8.27	-.17	16.87	-.43	3.13	113.89	-1.63	.00000	.00000	-1.00	-1.00	-1.00	-19999.009999.00			9999	0 2 0
49	8.24	-.15	16.85	-.43	3.36	112.59	-.38	.00443	.00465	4.93	3.75	5.08	94	.879999.00		-9	0 0 0
50	8.55	-.44	17.43	-.98	3.14	-1.009999.00		.00375	.00391	-1.00	-1.00	-1.00	88	.889999.00		-6	0 0 0
51	-1.009999.00		-1.009999.00		3.13	-1.009999.00		.00000	.00364	4.39	3.34	4.52	87	.889999.00		9999	1 0 0
52	8.51	-.40	17.40	-.94	3.20	113.63	-1.34	.00374	.00474	4.51	3.38	4.50	89	.889999.00		-17	0 0 0
53	8.62	-.53	17.61	-1.18	3.03	114.87	-2.64	.00424	.00441	4.53	3.33	4.50	92	.899999.00		-22	0 0 0
54	8.37	-.25	17.09	-.58	3.22	109.44	2.98	.00414	.00000	4.74	3.54	4.70	-19999.009999.00			-11	0 0 0
55	-1.009999.00		-1.009999.00		3.05	-1.009999.00		.00000	.00415	-1.00	-1.00	-1.00	84	.889999.00		9999	1 0 0
56	8.59	-.43	17.69	-1.08	1.98	-1.009999.00		.00000	.00000	4.13	3.13	3.43	-19999.009999.00			9999	0 2 0
57	8.20	-.04	16.76	-.15	2.00	-1.009999.00		.00000	.00000	4.22	3.29	3.35	-19999.009999.00			9999	0 2 0
58	8.52	-.35	17.40	-.79	1.63	-1.009999.00		.00000	.00000	3.94	3.95	3.26	-19999.009999.00			9999	0 2 0

WHEN NOTE=1, IONIC STRENGTH CALCULATED FROM CONDUCTIVITY.=2, IONIC STRENGTH ASSUMED ZERO.=3, IONIC STRENGTH GREATER THAN .005.
WHEN A SATURATION IS NEGATIVE, UNDERSATURATION OCCURS. WHEN POSITIVE, SUPERSATURATION./

L. ERIE INLAND WATERS CRUISE 67-1-04 STAT NOS NOT SAME PHOS PUMP THERMO

I	CACO3 PK	CACO3 SAT	CAMG(CO3)2 PK	CAMG(CO3)2 SAT	PPCO2 ATM	OHAP PK	OHAP SAT	IONIC STRENGTH IONS M/L	IONIC STRENGTH COND	PN/H	PK/H	P M/L	O2 SAT 0/0	EHROX VOLTS	EHSSO VOLTS	IEL 0/0	NOTES
1	8.08	.21	16.73	.23	3.20	111.60	1.99	.00457	.00595	4.87	3.72	5.57	80	.789999.00		-1	0 0 0
2	8.00	.29	16.59	.36	3.24	111.15	2.39	.00449	.00593	4.93	3.79	5.44	79	.789999.00		-9	0 0 0
3	8.21	.09	16.74	.23	3.15	109.67	3.95	.00443	.00556	4.77	3.77	4.62	74	.789999.00		7	0 0 0
4	8.32	.02	16.96	.01	3.04	110.05	3.55	.00448	.00573	4.69	3.46	4.57	77	.799999.00		3	0 0 0
5	8.16	.16	16.71	.32	3.20	109.52	4.24	.00432	.00566	4.88	3.76	4.61	84	.779999.00		0	0 0 0
6	8.23	.08	16.82	.20	3.16	108.83	4.90	.00432	.00604	4.80	3.78	4.61	87	.779999.00		-2	0 0 0
7	7.70	.61	15.92	1.08	3.71	111.69	2.00	.00412	.00498	5.32	4.15	5.10	82	.749999.00		-1	0 0 0
8	8.05	.25	16.38	.62	3.37	109.81	3.87	.00429	.00485	5.01	3.84	5.05	71	.769999.00		-0	0 0 0
9	8.26	.03	16.89	.06	3.15	109.16	4.40	.00420	.00529	4.76	3.67	5.14	81	.799999.00		-4	0 0 0
10	8.36	-.07	17.08	-.14	3.03	110.14	3.40	.00406	.00487	4.63	3.69	4.94	68	.799999.00		-6	0 0 0
11	8.15	.14	16.53	.41	3.29	109.96	3.59	.00455	.00549	4.85	3.91	4.80	72	.789999.00		15	0 0 0
12	8.20	.08	16.95	-.01	3.12	110.40	3.13	.00420	.00549	4.71	3.62	4.92	69	.799999.00		-8	0 0 0
13	7.68	.61	15.63	1.33	3.79	111.26	2.32	.00457	.00556	5.38	4.34	4.88	90	.759999.00		3	0 0 0
14	7.95	.29	16.24	.58	3.48	112.34	.87	.00449	.00461	5.12	4.08	4.86	70	.799999.00		-4	0 0 0
15	8.14	.14	16.64	.31	3.14	112.25	1.32	.00459	.00582	4.75	4.07	4.75	83	.789999.00		0	0 0 0
16	7.98	.30	16.35	.57	3.31	112.68	.80	.00467	.00564	5.03	3.86	4.75	78	.789999.00		-6	0 0 0
17	8.23	.05	16.83	.11	3.03	113.66	-.12	.00485	.00602	4.90	3.76	4.96	81	.799999.00		4	0 0 0
18	8.36	-.08	17.12	-.21	2.92	112.91	.54	.00474	.00571	4.66	3.40	4.90	72	.809999.00		-3	0 0 0
19	8.27	.02	16.93	-.00	3.01	113.18	.33	.00475	.00602	4.77	3.83	4.82	83	.799999.00		-0	0 0 0
20	8.29	-.01	16.93	.00	3.01	112.27	1.25	.00480	.00597	4.69	3.49	4.60	82	.809999.00		-5	0 0 0
21	8.10	.20	16.56	.40	3.22	112.71	.89	.00481	.00591	4.94	3.94	4.85	75	.789999.00		-1	0 0 0
22	8.13	.16	16.67	.28	3.16	113.61	-.04	.00470	.00600	4.91	3.59	5.78	89	.789999.00		-1	0 0 0
23	8.13	.16	16.80	.16	3.11	110.31	3.29	.00481	.00610	4.84	3.55	4.85	82	.789999.00		-9	0 0 0
24	8.11	.18	16.62	.32	3.03	110.14	3.40	.00511	.00643	4.83	4.04	4.75	77	.799999.00		-8	0 0 3
25	7.92	.37	16.18	.77	3.38	115.15	-1.59	.00495	.00580	5.08	3.93	5.03	86	.779999.00		-6	0 0 0
26	7.98	.30	16.28	.65	3.33	121.19	-7.67	.00509	.00624	5.06	3.89	5.22	87	.789999.00		-3	0 0 3
27	7.98	.31	16.31	.63	3.29	116.14	-2.59	.00492	.00591	5.05	3.76	5.19	92	.789999.00		-0	0 0 0
28	8.02	.26	16.44	.49	3.28	114.62	-1.12	.00495	.00621	5.07	3.81	4.81	90	.789999.00		-1	0 0 0
29	7.90	.36	16.21	.67	3.41	117.95	-4.56	.00487	.00626	5.16	3.76	5.52	96	.789999.00		-2	0 0 0
30	7.93	.31	16.25	.58	3.39	115.39	-2.13	.00489	.00626	5.14	3.94	5.25	94	.799999.00		-2	0 0 0
31	8.17	.11	16.74	.19	3.14	111.30	2.21	.00481	.00615	4.89	3.80	5.03	89	.799999.00		2	0 0 0
32	8.17	.10	16.64	.28	3.15	111.49	1.99	.00518	.00619	4.92	3.80	5.09	93	.799999.00		6	0 0 3
33	8.09	.18	16.46	.43	3.22	121.64	-8.25	.00526	.00611	5.00	3.88	5.27	98	.799999.00		3	0 0 3
34	8.48	-.30	17.32	-.66	2.93	116.19	-3.38	.00513	.00679	4.64	3.72	4.79	48	.859999.00		11	0 0 3
35	8.40	-.19	17.22	-.47	2.96	117.36	-4.33	.00502	.00674	4.72	2.60	5.40	57	.839999.00		-4	0 0 3
36	8.14	.14	16.71	.22	3.14	111.56	1.93	.00494	.00630	4.94	3.54	5.03	84	.799999.00		-3	0 0 0
37	8.16	.11	16.71	.19	3.15	113.85	-.40	.00493	.00645	4.90	3.83	5.09	87	.799999.00		-3	0 0 0
38	8.20	.07	16.81	.09	3.14	115.02	-1.58	.00492	.00630	4.87	3.94	5.23	94	.809999.00		-0	0 0 0
39	8.72	-.52	17.89	-1.17	2.83	115.59	-2.61	.00000	.00674	-1.00	-1.00	4.79	51	.859999.00		9999	1 0 3
40	8.31	-.03	16.99	-.07	3.03	113.05	.43	.00499	.00630	4.81	3.71	5.09	96	.809999.00		-1	0 0 0
41	8.37	-.13	17.14	-.32	2.90	112.40	.83	.00523	.00663	4.77	3.65	4.86	63	.829999.00		-2	0 0 3
42	7.82	.46	16.08	.84	3.50	117.77	-4.30	.00486	.00619	5.25	4.04	5.78	88	.779999.00		-0	0 0 0
43	8.48	-.30	17.36	-.71	2.89	119.89	-7.12	.00484	.00731	4.61	3.49	5.10	62	.859999.00		-5	0 0 0
44	7.97	.30	16.35	.56	3.33	114.96	-1.51	.00489	.00674	5.06	4.23	5.74	77	.789999.00		-1	0 0 0
45	8.02	.27	6.44	.50	3.29	115.01	-1.48	.00480	.00597	-1.00	1.00	1.00	79	.789999.00		-2	0 0 0
46	8.54	-.36	17.46	.81	2.84	116.34	-3.52	.00486	.00674	4.57	3.17	5.03	72	.859999.00		-1	0 0 0
47	8.41	-.20	17.25	.50	2.93	115.69	-2.65	.00486	.00621	4.58	3.60	5.23	67	.839999.00		-6	0 0 0
48	7.94	.34	16.25	.67	3.39	115.81	-2.33	.00487	.00621	5.14	3.60	5.27	71	.789999.00		-1	0 0 0
49	8.39	-.22	17.81	-1.20	2.96	115.40	-2.70	.00438	.00692	4.69	3.73	5.01	57	.859999.00		-17	0 0 0
50	8.46	-.29	17.34	-.70	2.87	116.87	-4.13	.00511	.00685	4.64	3.68	5.05	60	.869999.00		-4	0 0 3
51	8.06	.22	16.45	.47	3.28	118.85	-5.37	.00475	.00604	5.02	4.09	4.92	85	.789999.00		-1	0 0 0
52	8.59	-.39	17.56	-.86	2.80	113.21	-.29	.00516	.00674	4.56	3.51	4.81	49	.859999.00		-2	0 0 3
53	7.84	.45	16.05	.90	3.49	115.93	-2.39	.00480	.00588	5.31	4.02	4.93	92	.779999.00		-0	0 0 0
54	8.41	-.21	17.17	-.47	2.94	113.00	-.09	.00503	.00665	4.73	3.21	4.75	50	.849999.00		2	0 0 3
55	7.99	.29	16.30	.62	3.34	116.10	-2.60	.00493	.00604	5.07	3.98	5.40	90	.789999.00		3	0 0 0
56	8.53	-.35	17.47	-.79	2.85	113.74	-.89	.00486	.00665	4.59	3.11	4.73	47	.859999.00		-3	0 0 0
57	8.13	.14	16.63	.28	3.25	116.77	-3.31	.00469	.00615	4.99	2.38	5.44	89	.799999.00		6	0 0 0
58	7.95	.33	16.19	.74	3.47	118.42	-4.92	.00470	.00604	5.19	3.79	5.26	93	.779999.00		-1	0 0 0
59	8.48	-.29	17.44	-.76	2.86	115.99	-3.12	.00494	.00709	4.65	3.51	4.81	55	.859999.00		-2	0 0 0
60	8.17	.10	16.73	.17	3.21	117.41	-3.96	.00478	.00615	4.96	3.60	5.40	92	.799999.00		0	0 0 0
61	7.97	.31	16.42	.51	3.39	-1.009999.00		.00452	.00600	5.13	4.20	5.74	89	.789999.00		-1	0 0 0
62	8.65	-.46	17.70	-1.02	2.76	-1.009999.00		.00479	.00654	4.47	3.23	4.92	50	.869999.00		-1	0 0 0
63	8.06	.21	16.57	.33	3.27	-1.009999.00		.00476	.00606	5.02	4.00	5.30	90	.799999.00		-5	0 0 0
64	7.97	.34	16.28	.72	3.30	-1.009999.00		.00501	.00602	5.09	3.70	5.19	74	.779999.00		0	0 0 3
65	8.87	-.68	18.18	-1.51	2.53	-1.009999.00		.00486	.00685	4.23	2.93	4.93	56	.879999.00		-8	0 0 0
66	8.41	-.14	17.12	-.23	2.89	-1.009999.00		.00491	.00580	4.61	3.41	5.40	89	.819999.00		3	0 0 0
67	7.85	.45	16.04	.96	3.46	-1.009999.00		.00483	.00588	5.21	4.09	5.55	90	.769999.00		-4	0 0 0
68	8.82	-.62	18.04	-1.35	2.58	-1.009999.00		.00492	.00700	4.36	2.88	4.99	61	.869999.00		-0	0 0 0
69	8.04	.24	16.47	.46	3.29	-1.009999.00		.00479	.00597	5.03	4.01	5.38	84	.789999.00		2	0 0 0
70	7.85	.46	16.05	.96	3.46	-1.009999.00		.00478	.00578	5.19	4.12	5.02	95	.769999.00		2	0 0 0
71	8.78	-.58	17.96	-1.24	2.54	-1.009999.00		.00489	.00656	4.31	3.05	4.95	50	.869999.00		-3	0 0 0
72	8.17	.13	16.89	.07	3.16	-1.009999.00		.00434	.00593	4.95	3.17	4.99	90	.789999.00		-15	0 0 0
73	7.99	.29	16.38	.55	3.26	-1.009999.00		.00490	.00591	5.03	3.96	5.88	94	.789999.00		-6	0 0 0
74	8.89	-.72	18.15	-1.52	2.50	-1.009999.00		.00502	.00654	4.23	2.87	5.09	71	.889999.00		-2	0 0 3
75	8.24	.02	16.79	.10	3.08	-1.009999.00		.00486	.00600	-1.00	-1.00	-1.00	91	.809999.00		-2	0 0 0
76	8.03	.25	16.49	.42	3.27	-1.009999.00		.00487	.00617	5.01	4.13	5.57	96	.789999.00		0	0 0 0
77	8.86	-.69	18.14	-1.53	2.53	-1.009999.00		.00486	.00648	4.28	3.14	4.99	68	.889999.00		-2	0 0 0
78	8.23	.03	16.88	-.01	3.07	-1.009999.00		.00499	.00611	-1.00	-1.00	-1.00	98	.809999.00		-0	0 0 0
79	8.17	.11	16.75	.19	3.12	-1.009999.00		.00506	.00630	4.95	3.78	5.12	95	.799999.00		2	0 0 3
80	8.71	-.54	17.95	-1.30	2.66	-1.009999.00		.00486	.00709	4.45	3.31	4.81	58	.879999.00		-6	0 0 0
81	8.62	-.37	17.65	-.81	2.74	-1.009999.00		.00504	.00626	4.50	3.43	5.78	91	.839999.00		1	0 0 3
82	8.01	.27	16.38	.55	3.35	116.20	-2.69	.00477	.00584	5.04	3.81	4.95	88	.789999.00		10	0 0 0
83	8.08	.21	16.73	.23	3.20	111.09	2.50	.00457	.00595	4.87	3.72	5.57	80	.789999.00		-1	0 0 0
84	8.00	.29	16.59	.36	3.24	111.49	2.06	.00449	.00593	4.93	3.79	5.44	79	.789999.00		-9	0 0 0
85	8.21	.09	16.74	.23	3.15	109.51	4.11	.00443	.00556	4.77	3.77	4.62	74	.789999.00		7	0 0 0
86	8.32	-.02	16.96	.01	3.04	109.87	3.73	.00448	.00573	4.69	3.46	4.57	77	.799999.00		3	0 0 0
87	7.68	.61	15.63	1.33	3.79	112.20	1.39	.00457	.00556	5.38	4.34	4.80	90	.759999.00		3	0 0 0
88	7.95	.29	16.24	.58	3.48	112.28	.93	.00449	.00494	5.12	4.08	4.86	70	.799999.00		-4	0 0 0
89	8.23	.05	16.83	.11	3.03	113.66	-.12	.00485	.00602	4.90	3.75	4.96	81	.799999.00		4	0 0 0
90	8.36	-.08	17.12	-.21	2.92	112.58	.87	.00474	.00571	4.66	3.40	4.90	72	.809999.00		-3	0 0 0
91	8.27	.02	16.93	-.00	3.01	114.08	-.56	.00475	.00602	4.77	3.83	4.82	83	.799999.00		-0	0 0 0
92	8.29	-.01	16.93	.00	3.01	112.00	1.51	.00480	.00597	4.69	3.49	4.60	82	.809999.00		-5	0 0 0

	CACO3		CAMG(CO3)2			OHAP		IONIC STRENGTH					O2				
I	PK	SAT	PK	SAT	PPCO2 ATM	PK	SAT	IONS M/L	COND	PN/H	PK/H	PSI M/L	SAT 0/0	EHROX VOLTS	EHSSO VOLTS	IEL 0/0	NOTES
93	8.10	.20	16.56	.40	3.22	113.67	-.07	.00481	.00591	4.94	3.94	4.85	75	.789999.00		-1	0 0 0
94	8.13	.16	16.67	.28	3.16	112.61	.96	.00470	.00600	4.91	3.59	5.78	89	.789999.00		-1	0 0 0
95	8.13	.16	16.80	.16	3.11	110.28	3.33	.00481	.00610	4.84	3.55	4.85	82	.789999.00		-9	0 0 0
96	8.11	.18	16.62	.32	3.03	110.38	3.16	.00511	.00643	4.83	4.04	4.75	77	.799999.00		-8	0 0 3
97	7.92	.37	16.18	.77	3.38	115.60	-2.05	.00495	.00580	5.08	3.93	5.03	86	.779999.00		-6	0 0 0
98	7.98	.30	16.28	.65	3.33	118.36	-4.85	.00509	.00624	5.06	3.89	5.22	87	.789999.00		-3	0 0 3
99	8.02	.26	16.44	.49	3.28	111.53	1.96	.00495	.00621	5.07	3.81	4.81	90	.789999.00		-1	0 0 0
100	7.90	.36	16.21	.67	3.41	116.15	-2.76	.00488	.00626	5.16	3.94	5.52	96	.789999.00		-2	0 0 0
101	7.93	.31	16.25	.58	3.39	118.53	-5.27	.00489	.00626	5.14	3.94	5.25	94	.799999.00		-2	0 0 0
102	8.17	.11	16.74	.19	3.14	111.98	1.54	.00481	.00615	4.89	3.80	5.03	89	.799999.00		2	0 0 0
103	8.17	.10	16.64	.28	3.15	112.15	1.32	.00518	.00619	4.92	3.80	5.09	93	.799999.00		6	0 0 3
104	8.09	.18	16.46	.43	3.22	108.32	5.07	.00526	.00611	5.00	3.88	5.27	98	.799999.00		3	0 0 3
105	8.48	-.30	17.32	-.66	2.93	116.70	-3.88	.00513	.00679	4.64	3.72	4.79	48	.859999.00		11	0 0 3
106	8.40	-.19	17.22	-.47	2.96	116.59	-3.56	.00502	.00674	4.72	2.60	5.40	57	.839999.00		-4	0 0 3
107	8.14	.14	16.71	.22	3.14	111.15	2.34	.00494	.00630	4.94	3.54	5.03	84	.799999.00		-3	0 0 0
108	8.16	.11	16.72	.19	3.15	111.54	1.91	.00493	.00645	4.90	3.83	5.09	87	.799999.00		-3	0 0 0
109	8.08	.21	16.73	.23	3.20	111.91	1.67	.00457	.00595	4.87	3.72	5.57	80	.789999.00		-1	0 0 0
110	8.21	.09	16.74	.23	3.15	110.07	3.55	.00443	.00556	4.77	3.77	4.62	74	.789999.00		7	0 0 0
111	8.32	-.02	16.96	.01	3.04	107.98	5.62	.00448	.00573	4.69	3.46	4.57	77	.799999.00		3	0 0 0
112	8.16	.16	16.71	.32	3.20	108.91	4.86	.00432	.00566	4.88	3.76	4.61	84	.779999.00		0	0 0 0
113	8.23	.08	16.82	.20	3.16	108.78	4.95	.00432	.00604	4.80	3.78	4.61	87	.779999.00		-2	0 0 0
114	7.70	.61	15.92	1.08	3.71	112.44	1.25	.00412	.00498	5.32	4.15	5.10	82	.749999.00		-1	0 0 0
115	8.05	.25	16.38	.62	3.37	112.57	1.10	.00429	.00485	5.01	3.84	5.05	71	.769999.00		-0	0 0 0
116	8.26	.03	16.89	.06	3.15	109.62	3.94	.00420	.00529	4.76	3.67	5.14	81	.799999.00		-4	0 0 0
117	8.36	-.07	17.08	-.14	3.03	110.68	2.86	.00406	.00487	4.63	3.69	4.94	68	.799999.00		-6	0 0 0
118	8.15	.14	16.53	.41	3.29	110.10	3.45	.00455	.00549	4.85	3.91	4.80	72	.789999.00		15	0 0 0
119	8.20	.08	16.95	-.01	3.12	110.61	2.91	.00420	.00549	4.71	3.62	4.92	69	.799999.00		-8	0 0 0
120	7.68	.61	15.63	1.33	3.79	114.78	-1.20	.00457	.00556	5.38	4.34	4.88	90	.759999.00		3	0 0 0
121	7.95	.29	16.24	.58	3.48	114.39	-1.18	.00449	.00461	5.12	4.08	4.86	70	.799999.00		-4	0 0 0
122	8.14	.14	16.64	.31	3.14	112.57	1.00	.00459	.00582	4.75	4.07	4.75	83	.789999.00		0	0 0 0
123	7.98	.30	16.35	.57	3.31	113.24	.24	.00467	.00564	5.03	3.86	4.75	78	.789999.00		-6	0 0 0
124	8.23	.05	16.83	.11	3.03	113.10	.44	.00485	.00602	4.90	3.75	4.96	81	.799999.00		4	0 0 0
125	8.36	-.08	17.12	-.21	2.92	111.24	2.21	.00474	.00571	4.66	3.40	4.90	72	.809999.00		-3	0 0 0
126	8.27	.02	16.93	-.00	3.01	112.98	.54	.00475	.00602	4.77	3.83	4.82	83	.799999.00		-0	0 0 0
127	8.29	-.01	16.93	.00	3.01	114.08	-.56	.00480	.00597	4.69	3.49	4.60	82	.809999.00		-5	0 0 0
128	8.10	.20	16.56	.40	3.22	113.93	-.33	.00481	.00591	4.94	3.94	4.85	75	.789999.00		-1	0 0 0
129	8.13	.16	16.67	.28	3.16	114.39	-.82	.00470	.00600	4.91	3.59	5.78	89	.789999.00		-1	0 0 0
130	8.13	.16	16.80	.16	3.11	110.79	2.82	.00481	.00610	4.84	3.55	4.85	82	.789999.00		-9	0 0 0
131	8.11	.18	16.62	.32	3.03	110.98	2.57	.00511	.00643	4.83	4.04	4.75	77	.799999.00		-8	0 0 3
132	7.92	.37	16.18	.77	3.38	116.52	-2.97	.00495	.00580	5.08	3.93	5.03	86	.779999.00		-6	0 0 0
133	7.98	.30	16.28	.65	3.33	119.35	-5.84	.00509	.00624	5.06	3.89	5.22	87	.789999.00		-3	0 0 3
134	7.98	.31	16.31	.63	3.29	116.14	-2.59	.00492	.00591	5.05	3.76	5.19	92	.789999.00		-0	0 0 0
135	8.02	.26	16.43	.50	3.27	112.22	1.28	.00450	.00621	5.07	3.82	4.81	90	.789999.00		30	0 0 0
136	7.90	.36	16.21	.67	3.41	111.88	1.51	.00486	.00626	5.16	3.95	5.52	96	.789999.00		-3	0 0 0
137	7.93	.31	16.25	.58	3.39	117.00	-3.73	.00489	.00626	5.14	3.94	5.25	94	.799999.00		-2	0 0 0
138	8.17	.11	16.74	.19	3.14	112.04	1.47	.00481	.00615	4.89	3.80	5.03	89	.799999.00		2	0 0 0
139	8.17	.10	16.64	.28	3.15	112.72	.75	.00518	.00619	4.92	3.80	5.09	93	.799999.00		6	0 0 3
140	8.09	.18	16.46	.43	3.22	121.64	-8.25	.00526	.00611	5.00	3.88	5.27	98	.799999.00		3	0 0 3
141	8.48	-.30	17.32	-.66	2.93	114.27	-1.45	.00513	.00679	4.64	3.72	4.79	48	.859999.00		11	0 0 3
142	8.40	-.19	17.22	-.47	2.96	115.29	-2.26	.00502	.00674	4.72	2.60	5.40	57	.839999.00		-4	0 0 3
143	8.14	.14	16.71	.22	3.14	112.33	1.16	.00494	.00630	4.94	3.54	5.03	84	.799999.00		-3	0 0 0
144	8.16	.11	16.72	.19	3.15	112.39	1.06	.00493	.00645	4.90	3.83	5.09	87	.799999.00		-3	0 0 0
145	8.20	.07	16.81	.09	3.14	121.72	-8.28	.00492	.00630	4.87	3.94	5.23	94	.809999.00		-0	0 0 0

WHEN NOTE=1, IONIC STRENGTH CALCULATED FROM CONDUCTIVITY.=2, IONIC STRENGTH ASSUMED ZERO.=3, IONIC STRENGTH GREATER THAN .005.
WHEN A SATURATION IS NEGATIVE, UNDERSATURATION OCCURS. WHEN POSITIVE, SUPERSATURATION./

L ONTARIO 065-11 11/29/65 SYNOPTIC PTE DAUPHINE

I	CACO3 PK	CACO3 SAT	CAMG(CO3)2 PK	CAMG(CO3)2 SAT	PPCO2	OHAP PK	OHAP SAT	IONIC STRENGTH IONS	IONIC STRENGTH COND	PN/H	PK/H	PSI	O2 SAT	EHROX	EHSSO	IEL	NOTES
					ATM			M/L	M/L			M/L	0/0	VOLTS	VOLTS	0/0	
1	8.74	-.57	17.86	-1.25	2.73	116.89	-4.21	.00000	.00512	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 3
2	11.37	-3.26	23.15	-6.68	.48	143.91	-31.58	.00000	.00507	1.92	-1.00	6.08		-19999.009999.00		9999	1 0 3
3	8.67	-.51	17.78	-1.17	2.97	115.57	-2.89	.00000	.00505	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 3
4	8.74	-.58	17.94	-1.33	2.77	114.68	-2.00	.00000	.00511	4.36	-1.00	5.13		-19999.009999.00		9999	1 0 3
5	8.58	-.47	17.59	-1.12	3.04	115.20	-2.87	.00000	.00509	4.58	-1.00	5.57		-19999.009999.00		9999	1 0 3
6	8.62	-.51	17.68	-1.21	3.00	115.10	-2.78	.00000	.00505	4.53	-1.00	5.35		-19999.009999.00		9999	1 0 3
7	8.54	-.43	17.54	-1.07	3.05	116.04	-3.72	.00000	.00509	4.61	-1.00	5.38		-19999.009999.00		9999	1 0 3
8	8.64	-.54	17.68	-1.25	2.98	116.55	-4.32	.00000	.00498	4.53	-1.00	5.16		-19999.009999.00		9999	1 0 0
9	8.41	-.29	17.26	-.75	2.95	116.64	-4.23	.00000	.00512	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 3
10	8.44	-.29	17.32	-.75	3.04	115.63	-3.04	.00000	.00501	4.64	-1.00	6.48		-19999.009999.00		9999	1 0 3
11	8.42	-.25	17.28	-.67	3.00	115.39	-2.71	.00000	.00509	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 3
12	8.53	-.37	17.49	-.88	2.89	115.94	-3.25	.00000	.00498	4.52	-1.00	5.93		-19999.009999.00		9999	1 0 0
13	8.52	-.37	17.47	-.92	3.03	115.38	-2.83	.00000	.00507	4.61	-1.00	5.93		-19999.009999.00		9999	1 0 3
14	8.76	-.64	17.96	-1.46	2.77	115.14	-2.73	.00000	.00520	4.34	-1.00	5.09		-19999.009999.00		9999	1 0 3
15	8.53	-.41	17.44	-.96	3.13	116.01	-3.64	.00000	.00514	4.71	-1.00	6.48		-19999.009999.00		9999	1 0 3
16	8.57	-.43	17.56	-1.03	2.98	116.19	-3.71	.00000	.00503	4.56	-1.00	6.48		-19999.009999.00		9999	1 0 3
17	8.58	-.47	17.61	-1.14	3.04	115.54	-3.21	.00000	.00503	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 3
18	8.47	-.34	17.39	-.87	3.10	115.32	-2.87	.00000	.00501	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 3
19	8.68	-.58	17.80	-1.37	2.93	114.64	-2.41	.00000	.00514	4.47	-1.00	4.80		-19999.009999.00		9999	1 0 3
20	-1.009999.00		-1.009999.00		3.10	-1.009999.00		.00000	.00509	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 3
21	8.50	-.38	17.47	-.96	3.05	115.85	-3.44	.00000	.00498	4.63	-1.00	5.38		-19999.009999.00		9999	1 0 0
22	8.51	-.37	17.46	-.92	3.14	115.93	-3.43	.00000	.00509	4.67	-1.00	6.48		-19999.009999.00		9999	1 0 3
23	8.41	-.29	17.28	-.79	3.05	117.23	-4.86	.00000	.00501	4.70	-1.00	5.33		-19999.009999.00		9999	1 0 3
24	8.58	-.46	17.61	-1.11	2.98	116.57	-4.16	.00000	.00509	4.55	-1.00	6.48		-19999.009999.00		9999	1 0 3
25	8.54	-.41	17.54	-1.02	3.07	116.47	-4.01	.00000	.00500	4.63	-1.00	5.44		-19999.009999.00		9999	1 0 0
26	8.58	-.45	17.61	-1.09	2.87	116.99	-4.53	.00000	.00522	4.48	-1.00	6.08		-19999.009999.00		9999	1 0 3
27	8.57	-.44	17.57	-1.07	2.89	116.39	-3.98	.00000	.00505	4.51	-1.00	5.78		-19999.009999.00		9999	1 0 3

L ONTARIO 066-01 1/23/66 SYNOPTIC + CORE PTE DAUPHINE

I	CACO3 PK	CACO3 SAT	CAMG(CO3)2 PK	CAMG(CO3)2 SAT	PPCO2 ATM	OHAP PK	OHAP SAT	IONIC STRENGTH IONS M/L	IONIC STRENGTH COND	PN/H	PK/H	PSI M/L	O2 SAT 0/0	EHROX VOLTS	EHSSO VOLTS	IEL 0/0	NOTES
1	9.36	-1.31	19.22	-2.92	2.15	-1.009999.00		.00000	.00500	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 0
2	9.24	-1.19	18.96	-2.66	2.53	-1.009999.00		.00000	.00496	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 0
3	8.52	-.46	17.53	-1.19	3.20	115.20	-3.20	.00000	.00500	4.70	3.53	5.30		-19999.009999.00		9999	1 0 0
4	8.42	-.36	17.31	-.98	3.25	115.14	-3.17	.00000	.00500	4.77	3.61	5.38		-19999.009999.00		9999	1 0 0
5	8.39	-.31	17.27	-.90	3.09	115.50	-3.44	.00462	.00490	4.70	3.63	5.30		-19999.009999.00		5	0 0 0
6	8.37	-.30	17.23	-.87	3.27	115.07	-3.04	.00437	.00496	4.80	3.64	5.30		-19999.009999.00		23	0 0 0
7	8.60	-.54	17.68	-1.36	3.00	116.07	-4.12	.00441	.00496	4.55	3.42	5.30		-19999.009999.00		21	0 0 0
8	8.56	-.50	17.64	-1.31	3.02	116.01	-4.04	.00460	.00494	4.58	3.42	5.18		-19999.009999.00		9	0 0 0
9	8.49	-.43	17.47	-1.14	3.00	-1.009999.00		.00451	.00489	-1.00	-1.00	-1.00		-19999.009999.00		11	0 0 0
10	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00000	-1.00	-1.00	-1.00		-19999.009999.00		9999	0 2 0
11	8.43	-.36	17.37	-1.02	3.03	116.09	-4.07	.00445	.00494	4.64	3.49	5.30		-19999.009999.00		12	0 0 0
12	8.59	-.52	17.69	-1.34	2.99	116.01	-4.00	.00432	.00489	4.54	3.42	5.18		-19999.009999.00		21	0 0 0
13	8.52	-.45	17.51	-1.17	3.05	115.71	-3.71	.00000	.00492	-1.00	3.46	5.08		-19999.009999.00		9999	1 0 0
14	8.60	-.53	17.68	-1.33	2.90	116.09	-4.08	.00443	.00000	4.51	3.37	5.30		-19999.009999.00		16	0 0 0
15	8.53	-.48	17.53	-1.23	3.03	115.41	-3.53	.00454	.00501	4.63	3.45	5.08		-19999.009999.00		15	0 0 0
16	8.50	-.41	17.47	-1.07	3.02	115.01	-2.87	.00000	.00492	4.63	3.48	5.08		-19999.009999.00		9999	1 0 0
17	8.69	-.66	17.88	-1.63	2.82	115.32	-3.58	.00000	.00505	-1.00	3.27	5.18		-19999.009999.00		9999	1 0 3
18	8.57	-.53	17.63	-1.33	2.90	114.66	-2.79	.00448	.00494	4.54	3.42	5.08		-19999.009999.00		12	0 0 0
19	8.54	-.46	17.54	-1.18	3.10	-1.009999.00		.00000	.00507	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 3
20	8.52	-.44	17.52	-1.16	3.08	-1.009999.00		.00426	.00496	-1.00	-1.00	-1.00		-19999.009999.00		28	0 0 0
21	8.51	-.44	17.54	-1.19	3.13	-1.009999.00		.00462	.00492	4.64	3.50	5.30		-19999.009999.00		7	0 0 0
22	8.47	-.41	17.42	-1.09	3.04	-1.009999.00		.00437	.00489	4.63	3.48	5.30		-19999.009999.00		18	0 0 0
23	8.64	-.57	17.78	-1.43	2.83	115.41	-3.40	.00000	.00489	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 0
24	8.62	-.55	17.72	-1.38	2.87	118.54	-6.54	.00456	.00487	-1.00	-1.00	-1.00		-19999.009999.00		9	0 0 0
25	8.53	-.46	17.54	-1.20	2.90	-1.009999.00		.00451	.00490	4.55	3.38	5.30		-19999.009999.00		8	0 0 0
26	8.54	-.47	17.57	-1.22	2.82	-1.009999.00		.00461	.00487	4.49	3.33	4.60		-19999.009999.00		3	0 0 0
27	8.46	-.40	17.49	-1.18	2.89	-1.009999.00		.00461	.00496	-1.00	-1.00	-1.00		-19999.009999.00		3	0 0 0
28	8.50	-.44	17.60	-1.28	2.88	-1.009999.00		.00000	.00489	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 0
29	8.53	-.49	17.59	-1.31	2.97	115.88	-4.04	.00469	.00476	4.60	3.44	5.30		-19999.009999.00		12	0 0 0
30	8.51	-.46	17.50	-1.22	2.98	116.01	-4.15	.00000	.00490	-1.00	3.44	5.30		-19999.009999.00		9999	1 0 0
31	8.87	-.83	18.25	-1.98	3.31	-1.009999.00		.00000	.00500	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 0
32	8.57	-.52	17.64	-1.35	2.91	-1.009999.00		.00469	.00496	-1.00	-1.00	-1.00		-19999.009999.00		5	0 0 0
33	8.77	-.72	18.01	-1.71	3.05	-1.009999.00		.00000	.00501	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 3
34	8.56	-.50	17.61	-1.29	2.95	-1.009999.00		.00472	.00490	-1.00	-1.00	-1.00		-19999.009999.00		4	0 0 0
35	8.69	-.63	17.86	-1.53	2.98	116.15	-4.19	.00000	.00490	4.50	3.30	5.38		-19999.009999.00		9999	1 0 0
36	8.56	-.50	17.58	-1.25	3.01	116.18	-4.22	.00454	.00494	4.58	3.42	5.38		-19999.009999.00		11	0 0 0
37	8.67	-.60	17.84	-1.49	3.05	-1.009999.00		.00436	.00498	-1.00	-1.00	-1.00		-19999.009999.00		27	0 0 0
38	8.89	-.82	18.29	-1.92	3.18	-1.009999.00		.00387	.00498	-1.00	-1.00	-1.00		-19999.009999.00		60	0 0 0
39	8.77	-.70	18.03	-1.67	3.15	115.20	-3.15	.00000	.00542	4.53	3.38	5.30		-19999.009999.00		9999	1 0 3
40	8.77	-.69	18.03	-1.66	3.13	115.37	-3.32	.00416	.00489	4.54	3.37	5.18		-19999.009999.00		40	0 0 0
41	8.78	-.71	18.06	-1.70	3.19	-1.009999.00		.00419	.00500	-1.00	-1.00	-1.00		-19999.009999.00		37	0 0 0
42	8.78	-.70	18.05	-1.66	3.11	-1.009999.00		.00443	.00492	-1.00	-1.00	-1.00		-19999.009999.00		25	0 0 0
43	8.73	-.69	17.92	-1.66	3.26	114.48	-2.71	.00432	.00496	4.67	3.47	5.08		-19999.009999.00		31	0 0 0
44	8.67	-.59	17.82	-1.43	3.12	114.05	-1.96	.00421	.00498	4.53	3.44	5.08		-19999.009999.00		35	0 0 0
45	8.61	-.56	17.70	-1.39	2.89	116.21	-4.31	.00000	.00501	-1.00	3.34	5.48		-19999.009999.00		9999	1 0 3
46	8.58	-.52	17.64	-1.33	2.92	116.16	-4.25	.00000	.00492	4.57	3.40	5.48		-19999.009999.00		9999	1 0 0
47	8.55	-.47	17.57	-1.21	2.98	-1.009999.00		.00000	.00505	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 3
48	8.62	-.54	17.73	-1.36	2.88	-1.009999.00		.00463	.00500	-1.00	-1.00	-1.00		-19999.009999.00		5	0 0 0
49	8.58	-.50	17.63	-1.26	2.86	116.29	-4.23	.00447	.00500	4.51	3.45	5.38		-19999.009999.00		13	0 0 0
50	8.60	-.52	17.69	-1.32	2.92	116.10	-4.03	.00458	.00500	4.53	3.38	5.38		-19999.009999.00		10	0 0 0
51	8.50	-.43	17.49	-1.12	2.84	-1.009999.00		.00000	.00498	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 0
52	8.49	-.41	17.46	-1.09	2.89	-1.009999.00		.00470	.00494	-1.00	-1.00	-1.00		-19999.009999.00		1	0 0 0
53	8.53	-.47	17.56	-1.23	2.89	117.03	-5.07	.00534	.00490	4.58	3.41	5.78		-19999.009999.00		-16	0 0 3
54	8.51	-.44	17.50	-1.15	2.91	116.69	-4.68	.00000	.00494	4.57	3.39	5.30		-19999.009999.00		9999	1 0 0
55	8.57	-.53	17.63	-1.34	2.91	-1.009999.00		.00000	.00487	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 0
56	8.47	-.42	17.44	-1.14	2.95	-1.009999.00		.00471	.00485	-1.00	-1.00	-1.00		-19999.009999.00		-3	0 0 0
57	8.68	-.64	17.92	-1.67	2.87	117.06	-5.29	.00000	.00494	4.46	3.29	5.38		-19999.009999.00		9999	1 0 0
58	8.67	-.63	17.84	-1.56	2.87	117.10	-5.28	.00443	.00490	4.48	3.33	5.38		-19999.009999.00		14	0 0 0
59	8.61	-.58	17.74	-1.50	3.08	116.44	-4.70	.00457	.00500	4.60	3.47	5.38		-19999.009999.00		10	0 0 0
60	8.55	-.51	17.61	-1.34	3.07	115.89	-4.09	.00448	.00490	4.61	3.46	5.48		-19999.009999.00		10	0 0 0
61	8.62	-.58	17.74	-1.47	3.00	116.48	-4.68	.00000	.00498	4.55	3.35	5.48		-19999.009999.00		9999	1 0 0
62	8.69	-.62	17.85	-1.50	2.90	115.48	-3.47	.00466	.00494	4.46	3.33	5.38		-19999.009999.00		7	0 0 0
63	8.74	-.70	17.97	-1.69	2.80	-1.009999.00		.00456	.00496	-1.00	-1.00	-1.00		-19999.009999.00		9	0 0 0
64	8.63	-.58	17.74	-1.46	2.97	-1.009999.00		.00442	.00494	-1.00	-1.00	-1.00		-19999.009999.00		14	0 0 0
65	8.67	-.59	17.78	-1.42	2.90	116.22	-4.18	.00461	.00505	4.49	3.31	5.30		-19999.009999.00		12	0 0 0
66	8.70	-.63	17.85	-1.52	2.89	116.57	-4.61	.00445	.00494	4.47	3.29	5.38		-19999.009999.00		16	0 0 0
67	8.68	-.60	17.81	-1.43	2.86	-1.009999.00		.00488	.00492	-1.00	-1.00	-1.00		-19999.009999.00		2	0 0 0
68	8.60	-.51	17.69	-1.29	2.93	-1.009999.00		.00515	.00496	-1.00	-1.00	-1.00		-19999.009999.00		-7	0 0 3
69	8.66	-.59	17.79	-1.42	2.88	116.57	-4.50	.00000	.00501	-1.00	3.30	5.38		-19999.009999.00		9999	1 0 3
70	8.67	-.59	17.79	-1.43	2.90	116.51	-4.45	.00444	.00496	4.49	3.28	5.38		-19999.009999.00		16	0 0 0
71	8.68	-.61	17.84	-1.47	2.88	-1.009999.00		.00000	.00525	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 3
72	8.67	-.58	17.81	-1.41	2.88	-1.009999.00		.00468	.00494	-1.00	-1.00	-1.00		-19999.009999.00		7	0 0 0
73	8.72	-.67	17.92	-1.64	2.92	115.63	-3.79	.00000	.00503	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 3
74	8.62	-.58	17.74	-1.46	2.80	116.90	-5.08	.00000	.00496	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 0
75	8.67	-.64	17.81	-1.54	2.87	-1.009999.00		.00446	.00494	4.48	3.27	5.38		-19999.009999.00		15	0 0 0
76	8.61	-.57	17.69	-1.41	2.85	-1.009999.00		.00000	.00487	4.48	3.41	5.38		-19999.009999.00		9999	1 0 0
77	8.63	-.56	17.72	-1.35	2.91	-1.009999.00		.00464	.00507	-1.00	-1.00	-1.00		-19999.009999.00		7	0 0 0
78	8.58	-.50	17.66	-1.29	2.77	-1.009999.00		.00474	.00498	-1.00	-1.00	-1.00		-19999.009999.00		6	0 0 0
79	8.64	-.56	17.77	-1.39	2.89	-1.009999.00		.00000	.00507	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 3
80	8.68	-.60	17.86	-1.48	2.89	-1.009999.00		.00448	.00511	-1.00	-1.00	-1.00		-19999.009999.00		17	0 0 0
81	8.76	-.68	18.04	-1.66	2.95	115.77	-3.70	.00000	.00496	4.45	3.28	5.78		-19999.009999.00		9999	1 0 0
82	8.79	-.72	18.03	-1.67	2.93	116.15	-4.10	.00489	.00485	4.43	3.29	5.60		-19999.009999.00		8	0 0 0
83	8.78	-.70	18.03	-1.66	2.91	-1.009999.00		.00571	.00511	-1.00	-1.00	-1.00		-19999.009999.00		-17	0 0 3
84	8.76	-.70	18.01	-1.68	2.91	-1.009999.00		.00000	.00500	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 0
85	8.70	-.65	17.88	-1.59	2.86	-1.009999.00		.00461	.00500	-1.00	-1.00	-1.00		-19999.009999.00		11	0 0 0
86	8.78	-.73	18.05	-1.75	2.83	-1.009999.00		.00000	.00490	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 0
87	8.68	-.65	17.86	-1.61	2.90	116.49	-4.74	.00000	.00498	4.48	3.31	5.78		-19999.009999.00		9999	1 0 0
88	8.72	-.68	17.85	-1.59	2.90	115.73	-3.94	.00441	.01606	4.47	3.38	5.78		-19999.009999.00		29	0 0 0
89	8.68	-.64	17.87	-1.58	2.89	116.42	-4.58	.00457	.00498	4.45	3.33	5.60		-19999.009999.00		12	0 0 0
90	8.70	-.66	17.86	-1.58	2.94	116.46	-4.64	.00447	.00485	4.48	3.32	5.48		-19999.009999.00		18	0 0 0
91	8.73	-.68	17.90	-1.59	2.73	-1.009999.00		.00478	.00505	-1.00	-1.00	-1.00		-19999.009999.00		4	0 0 0
92	8.64	-.59	17.74	-1.44	2.84	-1.009999.00		.00000	.00489	-1.00	-1.00	-1.00		-19999.009999.00		9999	1 0 0

I	CACO3 PK	CACO3 SAT	CAMG(CO3)2 PK	CAMG(CO3)2 SAT	PPCO2 ATM	OHAP PK	OHAP SAT	IONIC STRENGTH IONS M/L	IONIC STRENGTH COND	PN/H	PK/H	PSI M/L	O2 SAT 0/0	EHROX VOLTS	EHSSO VOLTS	IEL 0/0	NOTES
93	8.59	-.53	17.64	-1.31	2.84	-1.009999.00		.00489	.00501	-1.00	-1.00	-1.00	-19999.009999.00			-1	0 0 0
94	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00501	-1.00	-1.00	-1.00	-19999.009999.00			9999	1 0 3
95	8.54	-.46	17.53	-1.15	2.88	116.23	-4.14	.00442	.00487	4.52	3.45	5.38	-19999.009999.00			11	0 0 0
96	8.58	-.50	17.63	-1.25	2.88	116.29	-4.21	.00456	.00490	4.52	3.37	5.48	-19999.009999.00			10	0 0 0
97	8.58	-.50	17.61	-1.24	2.86	-1.009999.00		.00558	.00501	-1.00	-1.00	-1.00	-19999.009999.00			-41	0 0 3
98	8.52	-.48	17.52	-1.26	2.95	115.83	-4.06	.00477	.00501	-1.00	-1.00	-1.00	-19999.009999.00			0	0 0 0
99	8.59	-.53	17.66	-1.34	2.94	115.98	-4.04	.00459	.00501	-1.00	-1.00	-1.00	-19999.009999.00			6	0 0 0
100	8.81	-.78	18.09	-1.86	2.96	114.50	-2.79	.00000	.00525	-1.00	3.31	5.78	-19999.009999.00			9999	1 0 3
101	8.99	-.95	18.42	-2.15	2.68	117.36	-5.55	.00484	.00512	4.23	3.05	5.48	-19999.009999.00			8	0 0 0
102	8.57	-.54	17.60	-1.34	3.01	-1.009999.00		.00000	.00501	-1.00	-1.00	-1.00	-19999.009999.00			9999	1 0 3
103	8.51	-.44	17.49	-1.14	2.94	-1.009999.00		.00461	.00494	-1.00	-1.00	-1.00	-19999.009999.00			7	0 0 0
104	8.78	-.74	18.03	-1.77	2.83	-1.009999.00		.00000	.00500	-1.00	-1.00	-1.00	-19999.009999.00			9999	1 0 0
105	8.75	-.70	18.02	-1.73	2.83	-1.009999.00		.00440	.00496	-1.00	-1.00	-1.00	-19999.009999.00			13	0 0 0
106	8.73	-.70	17.93	-1.69	2.84	117.60	-5.85	.00477	.00492	4.45	3.29	5.30	-19999.009999.00			4	0 0 0
107	8.63	-.59	17.75	-1.48	2.89	117.28	-5.48	.00000	.00479	4.50	3.30	5.48	-19999.009999.00			9999	1 0 0
108	8.76	-.72	17.98	-1.73	3.04	-1.009999.00		.00000	.00498	-1.00	-1.00	-1.00	-19999.009999.00			9999	1 0 0
109	8.86	-.82	18.21	-1.93	2.92	-1.009999.00		.00443	.00503	-1.00	-1.00	-1.00	-19999.009999.00			23	0 0 0
110	8.62	-.59	17.66	-1.43	2.95	-1.009999.00		.00000	.00483	-1.00	-1.00	-1.00	-19999.009999.00			9999	1 0 0
111	8.64	-.59	17.75	-1.45	2.91	-1.009999.00		.00000	.00479	-1.00	-1.00	-1.00	-19999.009999.00			9999	1 0 0
112	8.66	-.63	17.78	-1.54	2.94	-1.009999.00		.00480	.00496	-1.00	-1.00	-1.00	-19999.009999.00			4	0 0 0
113	8.67	-.64	17.78	-1.54	2.92	-1.009999.00		.00000	.00501	-1.00	-1.00	-1.00	-19999.009999.00			9999	1 0 3
114	8.82	-.79	18.11	-1.87	2.98	-1.009999.00		.00000	.00494	-1.00	-1.00	-1.00	-19999.009999.00			9999	1 0 0
115	8.81	-.79	18.10	-1.86	2.98	-1.009999.00		.00431	.00490	-1.00	-1.00	-1.00	-19999.009999.00			28	0 0 0
116	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00000	4.06	3.22	3.38	-19999.009999.00			9999	0 2 0
117	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00000	4.00	3.11	3.69	-19999.009999.00			9999	0 2 0
118	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00000	4.24	3.39	3.60	-19999.009999.00			9999	0 2 0
119	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00000	3.73	2.95	3.74	-19999.009999.00			9999	0 2 0

WHEN NOTE=1, IONIC STRENGTH CALCULATED FROM CONDUCTIVITY.=2, IONIC STRENGTH ASSUMED ZERO.=3, IONIC STRENGTH GREATER THAN .005.
WHEN A SATURATION IS NEGATIVE, UNDERSATURATION OCCURS. WHEN POSITIVE, SUPERSATURATION./

H6678 1966 SUMMER NORTHCHANNEL,LAKE HURON SUTHERLAND,PHOS+CORE WATER

I	CACO3 PK	CACO3 SAT	CAMG(CO3)2 PK	CAMG(CO3)2 SAT	PPCO2 ATM	OHAP PK	OHAP SAT	IONIC STRENGTH IONS M/L	IONIC STRENGTH COND M/L	PN/H	PK/H	PSI M/L	O2 SAT 0/0	EHROX VOLTS	EHSSO VOLTS	IEL 0/0	NOTES
1	-1.009999.00		-1.009999.00		2.21	-1.009999.00		.00000	.00000	3.82	4.25	3.10	-19999.009999.00			9999	0 2 0
2	8.66	-.44	17.52	-.77	2.30	-1.009999.00		.00000	.00000	3.89	3.31	2.99	-19999.009999.00			9999	0 2 0
3	9.28	-1.08	18.87	-2.17	2.26	-1.009999.00		.00000	.00000	3.38	2.86	4.23	-19999.009999.00			9999	0 2 0
4	8.77	-.56	17.80	-1.08	2.35	-1.009999.00		.00000	.00000	3.76	3.16	2.97	-19999.009999.00			9999	0 2 0
5	9.40	-1.18	18.96	-2.21	1.47	-1.009999.00		.00000	.00000	3.06	2.66	2.95	-19999.009999.00			9999	0 2 0
6	8.99	-.77	17.32	-.57	2.23	-1.009999.00		.00000	.00000	4.01	4.46	2.99	-19999.009999.00			9999	0 2 0
7	10.12	-2.01	20.30	-3.83	1.75	-1.009999.00		.00000	.00000	2.79	3.38	3.21	-19999.009999.00			9999	0 2 0
8	10.09	-1.98	20.20	-3.73	1.19	-1.009999.00		.00000	.00000	2.64	2.20	3.03	-19999.009999.00			9999	0 2 0
9	10.18	-2.04	20.61	-4.07	1.63	-1.009999.00		.00000	.00000	2.72	2.24	3.19	-19999.009999.00			9999	0 2 0
10	9.36	-1.23	19.05	-2.51	1.65	-1.009999.00		.00000	.00000	3.12	2.55	2.99	-19999.009999.00			9999	0 2 0
11	9.22	-1.08	18.66	-2.12	1.38	-1.009999.00		.00000	.00000	3.12	3.58	2.96	-19999.009999.00			9999	0 2 0
12	8.65	-.43	17.55	-.79	2.57	-1.009999.00		.00000	.00283	3.78	3.08	4.78	-19999.009999.00			9999	1 0 0
13	9.26	-1.14	18.87	-2.40	2.16	-1.009999.00		.00000	.00278	3.26	2.61	4.66	-19999.009999.00			9999	1 0 0
14	7.95	.16	16.06	.41	3.06	-1.009999.00		.00000	.00000	4.54	3.96	3.52	-19999.009999.00			9999	0 2 0
15	8.46	-.35	17.22	-.75	2.27	-1.009999.00		.00000	.00000	3.77	3.72	3.36	-19999.009999.00			9999	0 2 0
16	8.80	-.69	17.93	-1.48	1.78	-1.009999.00		.00000	.00000	3.33	2.75	3.17	-19999.009999.00			9999	0 2 0
17	9.22	-.92	18.84	-1.84	2.31	-1.009999.00		.00000	.00123	3.59	2.84	4.22	-19999.009999.00			9999	1 0 0
18	8.99	-.84	18.33	-1.75	2.71	-1.009999.00		.00000	.00140	3.90	3.27	4.18	-19999.009999.00			9999	1 0 0
19	10.17	-2.02	20.16	-3.58	1.09	-1.009999.00		.00000	.00000	2.51	1.91	2.92	-19999.009999.00			9999	0 2 0
20	9.65	-1.51	19.11	-2.57	1.36	-1.009999.00		.00000	.00000	2.87	3.08	2.92	-19999.009999.00			9999	0 2 0
21	9.59	-1.47	19.22	-2.71	1.23	-1.009999.00		.00000	.00000	3.04	2.32	2.89	-19999.009999.00			9999	0 2 0
22	9.33	-1.07	19.02	-2.15	1.96	-1.009999.00		.00000	.00206	3.20	2.59	4.52	-19999.009999.00			9999	1 0 0
23	8.34	-.23	17.01	-.54	3.15	-1.009999.00		.00000	.00241	4.28	3.68	4.42	-19999.009999.00			9999	1 0 0
24	10.13	-2.02	20.47	-4.00	1.17	-1.009999.00		.00000	.00000	2.55	2.15	3.20	-19999.009999.00			9999	0 2 0
25	10.03	-1.93	20.25	-3.81	1.12	-1.009999.00		.00000	.00000	2.84	2.85	2.86	-19999.009999.00			9999	0 2 0
26	9.01	-.92	18.35	-1.93	1.89	-1.009999.00		.00000	.00000	3.76	2.91	3.34	-19999.009999.00			9999	0 2 0
27	8.23	.05	16.81	.12	3.12	-1.009999.00		.00000	.00208	4.28	3.64	4.55	-19999.009999.00			9999	1 0 0
28	8.52	-.38	17.36	-.82	3.06	-1.009999.00		.00000	.00208	4.13	3.63	4.36	-19999.009999.00			9999	1 0 0
29	9.30	-1.18	18.65	-2.15	1.84	-1.009999.00		.00000	.00000	3.54	3.57	3.02	-19999.009999.00			9999	0 2 0
30	9.11	-1.00	18.37	-1.90	1.58	-1.009999.00		.00000	.00000	3.23	2.70	3.02	-19999.009999.00			9999	0 2 0
31	8.76	-.65	17.73	-1.27	1.53	-1.009999.00		.00000	.00000	3.45	2.76	3.01	-19999.009999.00			9999	0 2 0
32	8.54	-.23	17.36	-.37	2.74	-1.009999.00		.00000	.00208	3.93	3.29	4.57	-19999.009999.00			9999	1 0 0
33	9.47	-1.35	19.22	-2.75	2.03	-1.009999.00		.00000	.00235	3.22	2.53	4.42	-19999.009999.00			9999	1 0 0
34	9.18	-1.08	18.60	-2.15	2.10	-1.009999.00		.00000	.00000	4.01	2.91	3.09	-19999.009999.00			9999	0 2 0
35	9.01	-.91	18.33	-1.89	2.04	-1.009999.00		.00000	.00000	3.54	3.31	3.01	-19999.009999.00			9999	0 2 0
36	8.62	-.53	17.51	-1.11	2.20	-1.009999.00		.00000	.00000	3.92	3.12	3.08	-19999.009999.00			9999	0 2 0
37	8.56	-.27	17.43	-.47	2.85	-1.009999.00		.00000	.00224	3.98	3.41	4.60	-19999.009999.00			9999	1 0 0
38	8.31	-.18	16.89	-.38	3.33	-1.009999.00		.00000	.00211	4.40	3.77	4.35	-19999.009999.00			9999	1 0 0
39	9.22	-1.10	18.71	-2.22	1.92	-1.009999.00		.00000	.00000	3.36	2.72	2.99	-19999.009999.00			9999	0 2 0
40	8.88	-.77	18.02	-1.55	1.91	-1.009999.00		.00000	.00000	3.51	2.96	3.00	-19999.009999.00			9999	0 2 0
41	8.56	-.46	17.34	-.91	1.60	-1.009999.00		.00000	.00000	3.62	3.06	2.98	-19999.009999.00			9999	0 2 0
42	10.54	-2.26	21.43	-4.51	1.68	135.30	-21.81	.00000	.00028	2.43	2.13	4.32	-19999.009999.00			9999	1 0 0
43	11.15	-3.03	22.51	-6.00	1.34	-1.009999.00		.00000	.00021	1.92	1.43	4.11	-19999.009999.00			9999	1 0 0
44	10.08	-1.98	20.62	-4.17	1.61	-1.009999.00		.00000	.00000	2.76	2.11	3.42	-19999.009999.00			9999	0 2 0
45	10.17	-2.08	20.20	-3.80	1.49	-1.009999.00		.00000	.00000	2.70	2.09	3.22	-19999.009999.00			9999	0 2 0
46	8.04	.19	16.46	.32	3.43	116.47	-3.34	.00000	.00281	4.49	3.81	4.78	-19999.009999.00			9999	1 0 0
47	8.50	-.41	17.26	-.86	3.13	-1.009999.00		.00000	.00296	4.23	3.76	4.46	-19999.009999.00			9999	1 0 0
48	8.64	-.56	17.53	-1.13	2.52	-1.009999.00		.00000	.00000	3.97	3.27	3.43	-19999.009999.00			9999	0 2 0
49	8.90	-.81	18.02	-1.62	2.24	-1.009999.00		.00000	.00000	3.93	3.66	3.36	-19999.009999.00			9999	0 2 0
50	8.64	-.56	17.42	-1.02	2.46	-1.009999.00		.00000	.00000	4.17	3.44	3.44	-19999.009999.00			9999	0 2 0
51	8.37	-.09	17.04	-.11	3.07	119.80	-6.31	.00000	.00241	4.21	3.53	4.60	-19999.009999.00			9999	1 0 0
52	8.36	-.25	17.08	-.61	3.22	-1.009999.00		.00000	.00265	4.36	3.83	4.42	-19999.009999.00			9999	1 0 0
53	9.01	-.90	18.36	-1.89	2.04	-1.009999.00		.00000	.00000	3.46	2.91	3.14	-19999.009999.00			9999	0 2 0
54	8.69	-.58	17.75	-1.28	2.00	-1.009999.00		.00000	.00000	3.76	3.03	3.05	-19999.009999.00			9999	0 2 0
55	8.87	-.75	17.63	-1.16	1.90	-1.009999.00		.00000	.00000	3.64	2.91	3.03	-19999.009999.00			9999	0 2 0
56	8.17	.12	16.64	.31	3.26	-1.009999.00		.00000	.00000	4.33	3.73	4.74	-19999.009999.00			9999	0 2 0
57	8.56	-.44	17.31	-.80	2.98	-1.009999.00		.00000	.00000	4.14	3.49	4.35	-19999.009999.00			9999	0 2 0
58	9.10	-.98	18.44	-1.94	2.02	-1.009999.00		.00000	.00000	3.36	2.89	3.06	-19999.009999.00			9999	0 2 0
59	8.90	-.78	17.97	-1.50	1.89	-1.009999.00		.00000	.00000	3.48	3.02	2.99	-19999.009999.00			9999	0 2 0
60	8.97	-.96	18.08	-1.89	1.91	-1.009999.00		.00000	.00000	3.53	2.89	2.96	-19999.009999.00			9999	0 2 0
61	8.41	-.11	17.11	-.11	3.02	-1.009999.00		.00000	.00000	4.11	3.48	4.74	-19999.009999.00			9999	0 2 0
62	8.91	-.62	18.11	-1.15	2.47	-1.009999.00		.00000	.00000	3.55	2.89	4.60	-19999.009999.00			9999	0 2 0
63	9.47	-1.22	19.13	-2.31	1.76	-1.009999.00		.00000	.00000	3.08	2.58	3.14	-19999.009999.00			9999	0 2 0
64	9.14	-.95	18.41	-1.73	1.68	-1.009999.00		.00000	.00000	3.37	2.73	2.94	-19999.009999.00			9999	0 2 0
65	8.95	-.81	18.08	-1.54	1.60	-1.009999.00		.00000	.00000	3.54	2.68	2.99	-19999.009999.00			9999	0 2 0
66	8.38	-.09	17.05	-.09	3.11	-1.009999.00		.00000	.00000	4.17	3.51	4.74	-19999.009999.00			9999	0 2 0
67	9.55	-1.40	19.38	-2.80	2.20	-1.009999.00		.00000	.00000	3.16	2.45	4.42	-19999.009999.00			9999	0 2 0
68	9.33	-1.19	18.80	-2.24	1.94	-1.009999.00		.00000	.00000	3.18	2.65	3.09	-19999.009999.00			9999	0 2 0
69	8.98	-.84	18.16	-1.62	1.69	-1.009999.00		.00000	.00000	3.49	2.93	3.06	-19999.009999.00			9999	0 2 0
70	8.62	-.49	17.46	-.95	1.75	-1.009999.00		.00000	.00000	3.66	2.91	3.03	-19999.009999.00			9999	0 2 0
71	8.64	-.35	17.61	-.65	2.90	-1.009999.00		.00000	.00000	3.95	3.27	4.74	-19999.009999.00			9999	0 2 0
72	10.05	-1.84	20.31	-3.59	1.88	-1.009999.00		.00000	.00000	2.73	2.20	3.77	-19999.009999.00			9999	0 2 0
73	9.15	-.95	18.65	-1.94	2.28	-1.009999.00		.00000	.00000	3.49	2.87	3.28	-19999.009999.00			9999	0 2 0
74	9.24	-1.09	18.79	-2.21	1.93	-1.009999.00		.00000	.00000	3.53	3.33	3.32	-19999.009999.00			9999	0 2 0
75	8.30	-.15	16.87	-.29	2.80	-1.009999.00		.00000	.00000	4.65	3.55	3.38	-19999.009999.00			9999	0 2 0
76	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00000	-1.00	-1.00	-1.00	-19999.009999.00			9999	0 2 0
77	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00000	-1.00	-1.00	-1.00	-19999.009999.00			9999	0 2 0
78	-1.009999.00		-1.009999.00		1.62	-1.009999.00		.00000	.00000	-1.00	-1.00	-1.00	-19999.009999.00			9999	0 2 0

WHEN NOTE =1, IONIC STRENGTH CALCULATED FROM CONDUCTIVITY.=2, IONIC STRENGTH ASSUMED ZERO.=3, IONIC STRENGTH GREATER THAN .005.
WHEN A SATURATION IS NEGATIVE, UNDERSATURATION OCCURS. WHEN POSITIVE, SUPERSATURATION./

LAKE HURON SUMMER 1967 H-671

I	CACO3 PK	CACO3 SAT	CAMG(CO3)2 PK	CAMG(CO3)2 SAT	PPCO2 ATM	OHAP PK	OHAP SAT	IONIC STRENGTH IONS M/L	IONIC STRENGTH COND M/L	PN/H	PK/H	PSI M/L	O2 SAT 0/0	EHROX VOLTS	EHSSO VOLTS	IEL 0/0	NOTES
1	9.33	-1.01	18.88	-1.85	2.50	-1.009999.00		.00260	.00283	3.40	2.73	4.69	89	.829999.00		-14	0 0 0
2	8.75	-.48	17.73	-.83	3.21	-1.009999.00		.00251	.00292	4.08	3.53	4.64	83	.809999.00		-16	0 0 0
3	9.22	-.96	18.73	-1.87	2.81	-1.C09999.00		.00240	.00292	3.61	2.87	4.35	88	.839999.00		-9	C 0 0
4	9.03	-.79	18.28	-1.46	2.85	-1.009999.00		.00259	.00287	3.75	2.97	4.55	92	.839999.00		-27	C 0 0
5	8.73	-.45	17.73	-.80	3.12	-1.009999.00		.00000	.00000	4.00	3.27	4.75	-19999.009999.00			9999	0 2 0
6	9.12	-.87	18.56	-1.71	2.72	-1.009999.00		.00000	.00000	3.58	3.06	4.63	-19999.009999.00			9999	0 2 0
7	8.85	-.58	18.08	-1.17	3.49	-1.009999.00		.00000	.00296	4.17	3.49	4.69	106	.809999.00		9999	1 0 0
8	8.95	-.69	18.13	-1.24	3.55	-1.009999.00		.00000	.00298	4.18	3.17	4.62	99	.809999.00		9999	1 0 0
9	9.48	-1.33	19.18	-2.61	3.24	-1.009999.00		.00000	.00301	3.76	2.99	4.32	68	.879999.00		9999	1 0 0
10	8.95	-.67	18.10	-1.16	3.61	-1.009999.00		.00220	.00283	4.21	3.52	4.64	104	.799999.00		23	C 0 0
11	9.33	-1.09	18.90	-2.08	3.71	-1.009999.00		.00198	.00272	4.06	3.35	4.89	81	.829999.00		37	0 0 0
12	9.25	-.96	18.78	-1.82	3.46	-1.009999.00		.00000	.00296	4.00	3.10	4.84	102	.809999.00		9999	1 0 0
13	9.07	-.79	18.40	-1.47	3.50	-1.009999.00		.00000	.00278	4.07	3.30	4.79	81	.809999.00		9999	1 0 0
14	8.55	-.28	17.41	-.50	3.46	-1.009999.00		.00000	.00294	4.29	3.30	4.76	102	.799999.00		9999	1 0 0
15	8.97	-.74	18.20	-1.44	3.13	-1.009999.00		.00000	.00294	3.89	3.21	4.69	110	.839999.00		9999	1 0 0
16	9.45	-1.30	19.18	-2.61	2.74	-1.009999.00		.00000	.00300	3.45	2.90	4.41	70	.899999.00		9999	1 0 0
17	8.62	-.34	17.54	-.61	3.47	-1.009999.00		.00000	.00292	4.29	3.50	4.73	107	.799999.00		9999	1 0 0
18	8.86	-.61	18.00	-1.13	3.27	-1.009999.00		.00000	.00296	4.08	3.07	4.69	95	.819999.00		9999	1 0 0
19	9.32	-1.14	18.97	-2.32	2.92	-1.009999.00		.00000	.00296	3.67	2.64	4.50	79	.879999.00		9999	1 0 0
20	8.67	-.39	17.65	-.72	3.36	-1.009999.00		.00000	.00290	4.06	3.54	4.73	104	.799999.00		9999	1 0 0
21	8.78	-.54	17.90	-1.07	3.28	-1.009999.00		.00000	.00294	4.09	3.19	4.67	101	.819999.00		9999	1 0 0
22	9.26	-1.09	18.85	-2.20	2.94	-1.009999.00		.00000	.00296	3.65	2.74	4.69	88	.879999.00		9999	1 0 0
23	8.46	-.18	17.25	-.31	3.52	-1.009999.00		.00000	.00290	4.24	3.68	4.84	105	.789999.00		9999	1 0 0
24	8.85	-.59	18.00	-1.14	3.19	-1.009999.00		.00000	.00298	3.99	3.21	4.74	103	.819999.00		9999	1 0 0
25	8.58	-.44	17.47	-.92	3.68	-1.009999.00		.00000	.00298	4.38	3.65	4.43	74	.849999.00		9999	1 0 0
26	8.58	-.29	17.48	-.52	3.42	-1.009999.00		.00000	.00292	4.30	3.33	4.69	104	.789999.00		9999	1 0 0
27	8.92	-.66	18.19	-1.32	3.11	-1.009999.00		.00000	.00292	3.81	3.00	4.75	104	.829999.00		9999	1 0 0
28	9.62	-1.46	19.53	-2.94	2.62	-1.009999.00		.00000	.00300	3.37	2.28	4.56	84	.899999.00		9999	1 0 0
29	8.65	-.37	17.59	-.66	3.34	-1.009999.00		.00000	.00298	4.18	3.41	4.73	105	.799999.00		9999	1 0 0
30	9.01	-.78	18.32	-1.52	3.06	-1.009999.00		.00000	.00296	3.85	3.00	4.69	104	.839999.00		9999	1 0 0
31	9.50	-1.37	19.30	-2.76	2.70	-1.009999.00		.00000	.00296	3.45	2.82	4.44	73	.909999.00		9999	1 0 0
32	8.56	-.26	17.42	-.44	3.36	113.04	.62	.00264	.00329	4.01	3.37	4.70	102	.789999.00		0	0 0 0
33	8.78	-.49	17.85	-.91	3.15	116.41	-2.86	.00271	.00331	3.97	3.38	4.67	95	.809999.00		0	0 0 0
34	8.24	.07	16.77	.24	3.58	123.27	-9.55	.00284	.00340	4.39	3.94	4.64	108	.769999.00		-0	0 0 0
35	8.31	-.02	16.94	.02	3.54	116.12	-2.54	.00277	.00334	4.43	3.55	4.65	100	.779999.00		-1	0 0 0
36	9.35	-1.06	19.04	-2.07	2.55	119.58	-5.98	.00000	.00331	3.43	2.64	4.71	116	.839999.00		9999	1 0 0
37	8.93	-.69	18.15	-1.33	3.07	118.90	-5.69	.00000	.00338	3.82	2.82	4.72	107	.839999.00		9999	1 0 0
38	9.34	-1.20	18.99	-2.44	2.72	125.45	-12.93	.00000	.00369	3.44	2.74	4.30	59	.899999.00		9999	1 0 0
39	8.99	-.69	18.28	-1.30	2.94	125.68	-12.04	.00000	.00329	3.82	2.93	4.70	107	.809999.00		9999	1 0 0
40	9.20	-.92	18.72	-1.78	2.68	126.14	-12.60	.00000	.00334	3.60	2.15	4.65	105	.839999.00		9999	1 0 0
41	9.36	-1.06	19.04	-2.07	2.68	126.80	-13.16	.00000	.00292	3.49	2.26	4.72	110	.829999.00		9999	1 0 0
42	8.86	-.63	18.03	-1.24	3.37	126.07	-12.91	.00000	.00296	3.98	3.24	4.64	105	.829999.00		9999	1 0 0
43	8.87	-.67	18.08	-1.37	3.39	126.16	-13.21	.00000	.00298	4.07	3.27	4.64	98	.839999.00		9999	1 0 0
44	9.33	-1.21	19.02	-2.51	3.06	124.19	-11.78	.00000	.00300	3.65	2.98	4.37	67	.899999.00		9999	1 0 0
45	8.59	-.33	17.51	-.62	3.44	-1.009999.00		.00000	.00292	4.29	3.37	4.77	94	.799999.00		9999	1 0 0
46	8.75	-.49	17.79	-.94	3.34	-1.009999.00		.00000	.00298	4.00	3.56	4.74	101	.819999.00		9999	1 0 0
47	9.37	-1.17	19.08	-2.36	2.73	-1.009999.00		.00000	.00298	3.44	2.95	4.63	82	.869999.00		9999	1 0 0
48	8.60	-.32	17.51	-.59	3.45	-1.009999.00		.00000	.00292	4.24	3.57	4.73	103	.799999.00		9999	1 0 0
49	8.69	-.44	17.68	-.81	3.42	-1.009999.00		.00000	.00292	4.13	3.42	4.41	110	.809999.00		9999	1 0 0
50	8.95	-.71	18.19	-1.38	3.24	-1.009999.00		.00000	.00292	4.02	2.77	4.69	107	.829999.00		9999	1 0 0
51	9.06	-.86	18.48	-1.77	3.17	-1.009999.00		.00000	.00300	3.86	3.06	4.65	96	.849999.00		9999	1 0 0
52	9.11	-.80	18.53	-1.54	2.55	-1.009999.00		.00000	.00344	3.56	2.40	4.61	114	.829999.00		9999	1 0 0
53	9.10	-.82	18.31	-1.39	2.74	-1.009999.00		.00000	.00345	3.72	2.35	4.66	107	.829999.00		9999	1 0 0
54	9.36	-1.06	19.03	-2.04	2.33	-1.009999.00		.00000	.00340	3.31	2.24	4.65	110	.839999.00		9999	1 0 0
55	9.19	-.94	18.59	-1.77	2.61	-1.C09999.00		.00000	.00351	3.56	2.33	4.59	111	.859999.00		9999	1 0 0
56	9.50	-1.21	19.30	-2.32	2.13	-1.009999.00		.00000	.00338	3.14	2.21	4.65	113	.849999.00		9999	1 0 0
57	9.38	-1.09	18.59	-1.63	2.39	-1.009999.00		.00000	.00340	3.32	2.24	4.65	112	.849999.00		9999	1 0 0
58	9.31	-1.01	18.91	-1.93	2.47	-1.009999.00		.00000	.00338	3.30	2.58	4.70	114	.839999.00		9999	1 0 0
59	9.21	-.98	18.72	-1.93	2.58	-1.009999.00		.00000	.00347	3.41	2.60	4.55	107	.859999.00		9999	1 0 0
60	9.43	-1.13	19.19	-2.19	2.13	-1.009999.00		.00000	.00334	3.21	2.09	4.67	113	.849999.00		9999	1 0 0
61	9.33	-1.05	18.94	-2.02	2.43	-1.009999.00		.00000	.00340	3.34	2.37	4.69	114	.849999.00		9999	1 0 0
62	9.17	-.87	18.62	-1.63	2.57	-1.009999.00		.00000	.00336	3.48	2.80	4.59	113	.829999.00		9999	1 0 0
63	9.19	-.99	18.70	-1.98	2.63	-1.009999.00		.00000	.00358	3.49	2.59	4.53	106	.869999.00		9999	1 0 0

WHEN NOTE=1, IONIC STRENGTH CALCULATED FROM CONDUCTIVITY.=2, IONIC STRENGTH ASSUMED ZERO.=3, IONIC STRENGTH GREATER THAN .005.
WHEN A SATURATION IS NEGATIVE, UNDERSATURATION OCCURS. WHEN POSITIVE, SUPERSATURATION./

LAKE HURON SUMMER 1967 H-672

	CACO3		CAMG(CO3)2			OHAP		IONIC STRENGTH					O2				
I	PK	SAT	PK	SAT	PPCO2	PK	SAT	IONS	COND	PN/H	PK/H	PSI	SAT	EHROX	EHSSO	IEL	NOTES
					ATM			M/L				M/L	0/0	VOLTS	VOLTS	0/0	
1	10.07	-1.75	20.67	-3.63	2.52	-1.009999.00		.00168	.00114	2.98	2.49	4.71	103	.839999.00		9	0 0 0
2	11.27	-3.11	22.61	-6.02	1.89	-1.009999.00		.00131	.00123	2.36	1.86	4.12	41	.959999.00		-30	0 0 0
3	8.75	-.42	18.02	-.96	3.65	-1.009999.00		.00172	.00188	4.23	3.72	4.75	106	.769999.00		-2	0 0 0
4	9.10	-.78	18.84	-1.81	3.16	-1.009999.00		.00172	.00191	3.79	3.30	4.48	105	.799999.00		-15	0 0 0
5	11.16	-2.84	22.18	-5.15	2.55	-1.009999.00		.00086	.00068	2.60	2.20	6.08	96	.859999.00		-7	0 0 0
6	11.70	-3.45	23.29	-6.44	2.18	-1.009999.00		.00076	.00063	2.31	1.82	5.05	86	.909999.00		-23	0 0 0
7	10.73	-2.40	21.43	-4.37	2.11	-1.009999.00		.00139	.00105	2.50	2.09	4.55	101	.859999.00		-25	0 0 0
8	11.44	-3.33	22.96	-6.49	1.70	-1.009999.00		.00125	.00118	2.06	1.68	4.33	92	.989999.00		-44	0 0 0
9	10.99	-2.67	22.11	-5.06	2.44	-1.009999.00		.00149	.00149	2.65	2.26	4.83	104	.869999.00		-4	0 0 0
10	11.42	-3.28	22.99	-6.46	2.03	-1.009999.00		.00146	.00167	2.29	1.87	4.58	97	.969999.00		-25	0 0 0
11	10.65	-2.32	21.49	-4.43	2.48	-1.009999.00		.00133	.00129	2.78	2.29	4.70	80	.849999.00		-25	0 0 0
12	11.00	-2.70	22.16	-5.16	2.88	-1.009999.00		.00083	.00074	2.77	2.21	4.07	99	.859999.00		3	0 0 0
13	10.96	-2.65	22.27	-5.25	2.55	-1.009999.00		.00148	.00189	3.39	1.99	4.04	83	.859999.00		-8	0 0 0

LAKE ONAPING.SUMMER,1967. CORING.SI-P. LAT-LONG IN INCHES L-F MAP

	CACO3		CAMG(CO3)2			OHAP		IONIC STRENGTH					O2				
I	PK	SAT	PK	SAT	PPCO2	PK	SAT	IONS	COND	PN/H	PK/H	PSI	SAT	EHROX	EHSSO	IEL	NOTES
					ATM			M/L				M/L	0/0	VOLTS	VOLTS	0/0	
1	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00063	.00068	1.34	2.00	4.18		-19999.009999.00		8	0 0 0
2	10.28	-2.08	-1.009999.00		2.87	123.03	-10.08	.00000	.00052	2.02	2.87	4.16		-19999.009999.00		9999	1 0 0
3	11.07	-2.82	22.43	-5.58	2.04	140.30	-26.98	.00091	.00066	1.59	1.79	4.18		-19999.009999.00		-101	0 0 0
4	10.94	-2.80	-1.009999.00		2.10	137.27	-24.76	.00000	.00072	1.20	1.89	4.15		-19999.009999.00		9999	1 0 0
5	10.38	-2.07	-1.009999.00		1.55	138.54	-24.88	.00000	.00057	1.43	1.79	4.22		-19999.009999.00		9999	1 0 0
6	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00129	1.19	1.72	3.95		-19999.009999.00		9999	1 0 0
7	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00062	.00066	1.23	1.55	4.23		-19999.009999.00		9	0 0 0
8	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00065	.00070	1.69	2.14	4.22		-19999.009999.00		12	0 0 0
9	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00061	.00063	1.15	2.10	4.19		-19999.009999.00		10	0 0 0
10	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00063	1.01	1.47	4.17		-19999.009999.00		9999	1 0 0
11	11.54	-3.24	23.20	-6.20	2.37	141.31	-27.64	.00075	.00059	1.14	1.83	4.30		-19999.009999.00		-34	0 0 0
12	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00061	.00068	1.18	1.95	4.22		-19999.009999.00		12	0 0 0
13	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00060	.00063	1.30	1.06	4.22		-19999.009999.00		5	0 0 0
14	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00063	.00066	.88	1.63	4.22		-19999.009999.00		8	0 0 0
15	12.37	-4.08	24.98	-8.02	3.61	135.13	-21.54	.00063	.00059	1.40	2.04	4.25		-19999.009999.00		7	0 0 0
16	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00077	1.21	1.86	4.19		-19999.009999.00		9999	1 0 0
17	11.57	-3.33	23.36	-6.54	2.92	133.73	-20.49	.00070	.00066	1.47	2.24	4.15	99	.899999.00		-28	0 0 0
18	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00081	.00068	1.61	2.31	4.17	74	.899999.00		59	0 0 0
19	10.71	-2.47	21.64	-4.82	1.98	-1.009999.00		.00115	.00068	1.26	1.99	4.17	101	.899999.00		-111	0 0 0
20	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00062	.00066	1.52	2.07	4.17	73	.909999.00		11	0 0 0
21	11.35	-3.10	22.86	-6.03	2.58	135.21	-21.98	.00075	.00068	1.95	1.69	4.15	100	.899999.00		-52	0 0 0
22	11.62	-3.40	23.39	-6.62	2.92	138.11	-25.00	.00067	.00068	1.53	2.00	4.18	78	.899999.00		-24	0 0 0
23	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00065	.00070	1.42	1.96	4.09	102	.899999.00		-3	0 0 0
24	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00060	.00074	2.18	2.74	4.08	82	.899999.00		7	0 0 0
25	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00062	.00066	1.23	1.91	4.11	107	.909999.00		-6	0 0 0
26	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00068	1.41	1.88	4.09	87	.949999.00		9999	1 0 0
27	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00066	.00066	1.25	2.05	4.13	106	.909999.00		20	0 0 0
28	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00057	.00066	1.41	1.76	4.10	103	.919999.00		-5	0 0 0
29	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00059	.00065	1.21	1.26	4.21	109	.909999.00		-2	0 0 0
30	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00060	.00066	2.31	2.27	4.20	60	.919999.00		4	0 0 0
31	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00062	.00066	3.16	3.04	4.26	93	.829999.00		1	0 0 0
32	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00062	.00068	1.81	2.44	4.26	80	.859999.00		-9	0 0 0
33	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00063	1.33	1.85	4.11	110	.909999.00		9999	1 0 0
34	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00066	1.23	1.66	4.08	87	.919999.00		9999	1 0 0
35	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00079	.00066	1.64	1.65	4.13	109	.899999.00		46	0 0 0
36	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00064	.00068	1.18	2.10	4.13	91	.919999.00		12	0 0 0
37	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00052	.00066	1.76	2.12	4.14	108	.899999.00		-23	0 0 0
38	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00066	1.22	1.88	4.14	106	.919999.00		9999	1 0 0
39	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00059	.00063	1.64	1.65	4.17	105	.889999.00		5	0 0 0
40	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00063	.00065	1.13	2.17	4.17	94	.899999.00		10	0 0 0
41	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00065	.00066	1.49	2.07	4.13	104	.909999.00		24	0 0 0
42	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00063	.00065	1.79	1.86	4.20	89	.929999.00		24	0 0 0
43	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00063	.00065	.98	1.62	4.13	113	.919999.00		4	0 0 0
44	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00080	.00068	1.30	1.91	4.13	83	.959999.00		54	0 0 0
45	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00066	.00068	1.67	2.16	4.13	119	.899999.00		23	0 0 0
46	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00065	.00070	1.64	2.26	4.16	81	.909999.00		14	0 0 0
47	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00062	.00070	1.75	2.56	4.15	105	.879999.00		8	0 0 0
48	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00062	.00066	1.47	1.94	4.16	86	.909999.00		16	0 0 0
49	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00061	.00068	1.66	2.05	4.15	106	.899999.00		12	0 0 0
50	10.86	-2.66	21.97	-5.25	2.03	135.80	-22.83	.00106	.00068	1.10	2.16	4.18	80	.919999.00		-116	0 0 0
51	11.19	-2.93	22.55	-5.67	2.72	-1.009999.00		.00075	.00059	2.03	2.18	4.10	100	.879999.00		-53	0 0 0
52	9.82	-1.57	-1.009999.00		2.36	-1.009999.00		.00000	.00070	2.53	2.65	4.09	90	.859999.00		9999	1 0 0
53	11.51	-3.25	23.45	-6.56	2.03	141.37	-27.96	.00078	.00070	1.00	1.92	4.07	107	.909999.00		-78	0 0 0
54	11.70	-3.66	23.56	-7.29	2.14	144.14	-32.33	.00084	.00068	1.59	1.79	4.06	78	1.009999.00		-58	0 0 0
55	11.45	-3.19	-1.009999.00		2.02	140.76	-27.36	.00000	.00068	1.47	1.39	4.09	94	.909999.00		9999	1 0 0
56	11.72	-3.47	23.63	-6.81	2.15	140.73	-27.51	.00076	.00068	1.09	1.59	4.05	95	.919999.00		-54	0 0 0
57	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00068	1.72	1.90	4.09	107	.899999.00		9999	1 0 0
58	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00063	.00068	1.24	2.06	4.10	77	.889999.00		5	0 0 0
59	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00054	.00066	1.87	2.15	4.10	78	.889999.00		-19	0 0 0
60	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00065	1.73	1.97	4.10	79	.899999.00		9999	1 0 0
61	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00066	1.65	-1.00	4.10	74	.899999.00		9999	1 0 0
62	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00061	.00066	1.12	1.63	4.08	107	.909999.00		3	0 0 0
63	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00063	.00068	1.08	1.85	4.08	87	.909999.00		13	0 0 0
64	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00064	.00068	1.51	1.44	4.08	85	.909999.00		8	0 0 0
65	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00066	.00068	.79	1.57	4.08	88	.909999.00		15	0 0 0
66	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00065	.00066	1.16	1.89	4.08	84	.909999.00		17	0 0 0
67	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00064	.00068	1.26	1.96	4.06	78	.909999.00		7	0 0 0
68	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00064	.00070	1.02	1.76	4.02	77	.939999.00		12	0 0 0
69	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00063	-1.00	-1.00	-1.00	90	.919999.00		9999	1 0 0
70	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00066	.91	1.49	4.08	81	.929999.00		9999	1 0 0
71	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00057	.00057	1.01	1.72	4.26	93	.899999.00		-13	0 0 0
72	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00057	1.13	1.86	4.23	84	.899999.00		9999	1 0 0
73	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00000	.00063	1.23	-1.00	4.17	87	.909999.00		9999	1 0 0
74	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00066	.00065	1.27	1.78	4.11	73	.919999.00		21	0 0 0
75	11.78	-3.52	23.59	-6.73	2.71	140.58	-27.26	.00074	.00066	.93	1.39	4.13	104	.899999.00		-22	0 0 0
76	11.99	-3.78	24.13	-7.41	2.69	142.01	-29.05	.00066	.00066	1.51	1.40	4.13	78	.929999.00		-26	0 0 0
77	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00061	.00065	.73	1.00	4.17	108	.909999.00		-0	0 0 0
78	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00064	.00066	.76	1.33	4.16	69	.909999.00		13	0 0 0
79	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00062	.00065	1.05	1.19	4.12	104	.899999.00		4	0 0 0
80	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00070	.00068	.96	1.25	4.13	79	.899999.00		27	0 0 0
81	12.05	-3.78	-1.009999.00		2.64	142.70	-29.26	.00000	.00066	1.35	1.07	4.12	102	.909999.00		9999	1 0 0
82	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00063	.00063	1.65	.88	4.10	85	.909999.00		-10	0 0 0
83	12.27	-3.99	24.73	-7.80	3.44	-1.009999.00		.00061	.00068	1.45	2.02	4.17		-19999.009999.00		5	0 0 0
84	11.05	-2.80	22.19	-5.33	3.34	-1.009999.00		.00070	.00068	1.86	2.68	4.22		-19999.009999.00		-18	0 0 0
85	11.74	-3.45	23.58	-6.64	2.37	140.96	-27.42	.00075	.00068	1.10	1.81	4.09		-19999.009999.00		-23	0 0 0
86	11.94	-3.73	24.06	-7.32	2.46	141.67	-28.66	.00071	.00070	1.05	1.82	4.07		-19999.009999.00		-16	0 0 0
87	12.21	-3.91	24.57	-7.59	2.96	-1.009999.00		.00066	.00068	1.20	1.89	4.09		-19999.009999.00		4	0 0 0
88	11.69	-3.41	23.58	-6.64	2.42	-1.009999.00		.00072	.00068	1.18	1.69	4.09		-19999.009999.00		-36	0 0 0
89	12.46	-4.18	25.13	-8.20	3.22	-1.009999.00		.00065	.00068	1.22	1.79	4.05		-19999.009999.00		10	0 0 0
90	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00061	.00068	1.21	1.69	4.08		-19999.009999.00		14	0 0 0

I	CACO3 PK	CACO3 SAT	CAMG(CO3)2 PK	CAMG(CO3)2 SAT	PPCO2 ATM	OHAP PK	OHAP SAT	IONIC STRENGTH IONS M/L	IONIC STRENGTH COND	PN/H	PK/H	PSI M/L	O2 SAT O/O	EHROX VOLTS	EHSSO VOLTS	IEL O/O	NOTES
91	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00063	.00070	1.11	1.58	4.06	-19999.009999.00			16	0 0 0
92	13.22	-5.04	26.80	-10.13	3.54	139.61	-26.79	.00061	.00070	.99	1.82	4.05	-19999.009999.00			5	0 0 0
93	13.07	-4.77	26.28	-9.30	3.56	-1.009999.00		.00064	.00070	1.03	1.65	4.05	-19999.009999.00			13	0 0 0
94	12.44	-4.29	25.06	-8.47	2.74	-1.009999.00		.00070	.00070	1.05	1.64	3.98	-19999.009999.00			-3	0 0 0
95	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00068	.00070	1.14	1.74	4.08	-19999.009999.00			30	0 0 0
96	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00063	.00068	.98	1.88	4.06	-19999.009999.00			21	0 0 0
97	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00065	.00074	1.25	1.93	4.08	-19999.009999.00			15	0 0 0
98	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00060	.00070	.95	1.55	4.05	-19999.009999.00			12	0 0 0
99	13.06	-4.76	26.38	-9.39	3.52	142.91	-29.26	.00066	.00070	1.06	1.66	4.11	-19999.009999.00			10	0 0 0
100	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00064	.00070	1.14	1.69	4.03	-19999.009999.00			17	0 0 0
101	12.35	-4.07	24.89	-7.97	2.49	145.77	-32.28	.00067	.00059	.86	1.49	4.11	99	.909999.00		-14	0 0 0
102	12.75	-4.49	25.01	-8.15	2.29	151.11	-37.79	.00065	.00063	.77	1.39	4.06	86	.929999.00		-18	0 0 0
103	11.96	-3.68	23.92	-6.99	2.88	139.99	-26.49	.00063	.00059	1.38	1.93	4.09	98	.889999.00		-16	0 0 0
104	12.76	-4.65	25.62	-9.16	2.03	146.88	-34.61	.00064	.00068	.50	1.38	4.02	65	1.009999.00		-16	0 0 0
105	11.72	-3.44	23.57	-6.65	2.46	-1.009999.00		.00067	.00059	1.19	1.87	4.10	99	.899999.00		-37	0 0 0
106	12.61	-4.46	-1.009999.00		1.85	-1.009999.00		.00000	.00068	.52	1.25	3.96	40	.989999.00		9999	1 0 0
107	11.75	-3.46	23.65	-6.70	2.88	136.62	-23.08	.00067	.00057	1.37	2.02	4.11	94	.879999.00		-24	0 0 0
108	12.60	-4.38	25.25	-8.47	2.04	149.14	-36.03	.00067	.00063	.52	1.35	4.03	69	.949999.00		-23	0 0 0
109	11.67	-3.38	23.52	-6.56	2.58	-1.009999.00		.00067	.00059	1.23	1.89	4.09	105	.889999.00		-42	0 0 0
110	12.53	-4.38	25.18	-8.59	2.07	-1.009999.00		.00067	.00068	.60	1.33	4.02	83	.979999.00		-20	0 0 0
111	11.77	-3.48	23.71	-6.77	2.71	-1.009999.00		.00068	.00065	1.22	1.82	4.09	102	.889999.00		-20	0 0 0
112	12.55	-4.27	24.85	-7.92	3.34	-1.009999.00		.00067	.00065	1.18	2.20	4.08	80	.889999.00		22	0 0 0
113	11.98	-3.66	24.02	-6.99	2.26	142.92	-29.15	.00068	.00057	.87	1.69	4.12	96	.889999.00		-31	0 0 0
114	12.79	-4.61	-1.009999.00		1.90	147.19	-34.32	.00000	.00063	.40	.92	4.02	54	.979999.00		9999	1 0 0
115	11.88	-3.59	23.85	-6.91	2.95	-1.009999.00		.00070	.00065	1.39	2.05	4.06	104	.889999.00		-1	0 0 0
116	12.02	-3.75	24.17	-7.27	3.02	-1.009999.00		.00069	.00063	1.38	2.11	4.07	85	.889999.00		6	0 0 0
117	12.02	-3.74	24.24	-7.30	2.99	139.96	-26.42	.00065	.00068	1.26	1.85	4.09	102	.889999.00		1	0 0 0
118	12.35	-4.20	24.97	-8.39	2.49	148.74	-36.15	.00067	.00072	.83	1.60	4.00	73	.969999.00		-12	0 0 0
119	11.57	-3.27	23.27	-6.30	2.48	140.01	-26.41	.00076	.00068	1.23	1.85	4.09	98	.889999.00		-25	0 0 0
120	12.24	-4.05	24.46	-7.78	2.28	143.30	-30.42	.00072	.00072	.77	1.66	4.03	67	.949999.00		-19	0 0 0
121	12.36	-4.05	24.97	-7.95	2.74	144.34	-30.60	.00069	.00074	.95	1.57	4.09	-19999.009999.00			-4	0 0 0
122	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00066	.00070	.99	1.89	4.03	-19999.009999.00			22	0 0 0
123	11.61	-3.31	23.42	-6.45	2.74	138.57	-24.96	.00070	.00068	1.33	1.99	4.08	98	.879999.00		-9	0 0 0
124	12.06	-3.79	24.34	-7.43	2.32	143.49	-30.04	.00069	.00065	.90	1.33	4.11	67	.909999.00		-17	0 0 0
125	11.42	-3.12	23.06	-6.08	2.85	-1.009999.00		.00072	.00068	1.48	2.02	4.11	99	.869999.00		-23	0 0 0
126	12.03	-3.77	24.21	-7.36	2.26	-1.009999.00		.00072	.00068	1.00	1.52	4.07	70	.919999.00		-20	0 0 0
127	12.60	-4.32	25.35	-8.43	3.10	142.31	-28.82	.00067	.00066	1.07	1.59	4.10	98	.899999.00		0	0 0 0
128	12.66	-4.40	25.51	-8.63	3.05	144.95	-31.59	.00000	.00068	.97	1.74	4.10	84	.919999.00		9999	1 0 0
129	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00062	.00059	1.06	1.83	4.13	-19999.009999.00			23	0 0 0
130	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00063	.00057	1.16	1.88	4.14	-19999.009999.00			20	0 0 0
131	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00062	.00063	1.37	1.92	4.13	-19999.009999.00			15	0 0 0
132	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00063	.00063	1.11	1.98	4.11	-19999.009999.00			20	0 0 0
133	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00064	.00063	.92	1.74	4.11	-19999.009999.00			15	0 0 0
134	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00063	.00063	1.03	1.58	4.06	-19999.009999.00			17	0 0 0
135	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00064	.00063	.89	1.61	4.10	-19999.009999.00			7	0 0 0
136	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00065	.00063	1.01	1.62	4.12	-19999.009999.00			16	0 0 0
137	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00065	.00063	1.15	1.67	4.08	-19999.009999.00			13	0 0 0
138	12.89	-4.61	26.00	-9.07	3.75	-1.009999.00		.00064	.00063	1.21	1.98	4.10	-19999.009999.00			8	0 0 0
139	12.19	-3.90	24.75	-7.81	2.90	140.50	-26.97	.00069	.00066	1.05	1.71	4.12	-19999.009999.00			0	0 0 0
140	-1.009999.00		-1.009999.00		-1.00	-1.009999.00		.00065	.00066	1.05	1.86	4.11	-19999.009999.00			20	0 0 0
141	12.99	-4.71	26.17	-9.24	3.64	135.65	-22.16	.00065	.00065	1.10	1.73	4.11	-19999.009999.00			11	0 0 0
142	12.72	-4.45	25.65	-8.75	3.33	141.47	-28.05	.00066	.00065	1.24	1.85	4.11	-19999.009999.00			9	0 0 0
143	10.59	-2.28	21.16	-4.13	1.17	-1.009999.00		.00000	.00000	2.23	1.92	3.45	-19999.009999.00			9999	0 2 0
144	9.68	-1.37	19.63	-2.60	1.50	-1.009999.00		.00000	.00000	2.84	2.47	3.19	-19999.009999.00			9999	0 2 0
145	11.60	-3.41	23.30	-6.62	.56	-1.009999.00		.00000	.00000	1.27	.59	3.77	-19999.009999.00			9999	0 2 0
146	10.10	-1.78	20.47	-3.44	1.37	-1.009999.00		.00000	.00000	2.69	2.42	3.36	-19999.009999.00			9999	0 2 0
147	9.50	-1.17	19.37	-2.28	1.38	-1.009999.00		.00000	.00000	2.85	2.91	3.26	-19999.009999.00			9999	0 2 0
148	11.77	-3.53	23.75	-6.95	1.60	-1.009999.00		.00000	.00000	1.57	1.16	3.61	-19999.009999.00			9999	0 2 0

WHEN NOTE=1, IONIC STRENGTH CALCULATED FROM CONDUCTIVITY.=2, IONIC STRENGTH ASSUMED ZERO.=3, IONIC STRENGTH GREATER THAN .005.
WHEN A SATURATION IS NEGATIVE, UNDERSATURATION OCCURS. WHEN POSITIVE, SUPERSATURATION./

LAKE AGNEW SUMMER 1967 A-671

I	CACO3 PK	CACO3 SAT	CAMG(CO3)2 PK	CAMG(CO3)2 SAT	PPCO2 ATM	OHAP PK	OHAP SAT	IONIC STRENGTH IONS M/L	IONIC STRENGTH COND M/L	PN/H	PK/H	PSI M/L	O2 SAT 0/0	EHROX VOLTS	EHSSO VOLTS	IEL 0/0	NOTES
1	11.37	-3.12	23.08	-6.22	2.84	-1.009999.00		.00073	.00074	2.56	1.46	4.02	90	.889999.00		14	0 0 0
2	11.17	-2.91	22.61	-5.73	2.79	-1.009999.00		.00076	.00072	2.67	1.54	4.02	91	.879999.00		6	0 0 0
3	11.00	-2.75	22.41	-5.57	2.82	-1.009999.00		.00075	.00068	2.83	1.64	4.01	88	.879999.00		-9	0 0 0
4	11.43	-3.17	22.99	-6.11	2.64	-1.009999.00		.00074	.00057	2.55	1.02	4.19	89	.889999.00		-22	0 0 0
5	11.02	-2.75	22.36	-5.47	2.87	-1.009999.00		.00079	.00068	2.74	1.59	4.01	83	.879999.00		4	0 0 0
6	11.01	-2.74	22.37	-5.45	2.65	-1.009999.00		.00079	.00077	2.64	1.17	4.04	83	.879999.00		-12	0 0 0
7	10.98	-2.73	22.06	-5.21	2.72	-1.009999.00		.00085	.00076	2.78	1.30	3.99	82	.879999.00		-8	0 0 0
8	11.13	-2.82	22.43	-5.42	2.76	-1.009999.00		.00084	.00076	2.76	1.21	4.05	94	.859999.00		15	0 0 0
9	11.23	-2.93	22.74	-5.75	2.71	-1.009999.00		.00079	.00072	2.65	1.76	4.06	85	.869999.00		8	0 0 0
10	10.98	-2.69	22.71	-5.76	2.99	-1.009999.00		.00061	.00074	2.83	.76	4.09	83	.859999.00		-4	0 0 0
11	10.79	-2.51	21.90	-4.99	3.06	-1.009999.00		.00076	.00081	2.93	1.76	4.06	63	.859999.00		-2	0 0 0
12	10.90	-2.61	22.09	-5.14	2.97	-1.009999.00		.00075	.00077	2.88	1.65	4.11	55	.849999.00		10	0 0 0
13	11.02	-2.74	22.19	-5.27	2.99	-1.009999.00		.00078	.00083	2.85	1.99	4.12	60	.859999.00		15	0 0 0
14	11.55	-3.26	23.38	-6.42	2.58	-1.009999.00		.00072	.00072	2.32	1.15	4.14	76	.879999.00		10	0 0 0

to $CaCO_3$, $CaMg(CO_3)_2$, and $Ca_{10}(PO_4)_6(OH)_2$ in the summer and unsaturated in the winter.

(4) Non-carbonate terrane lakes are always unsaturated with respect to $CaCO_3$, $CaMg(CO_3)_2$, and $Ca_{10}(PO_4)_6(OH)_2$.

(5) Igneous rock terrane lakes are in equilibrium with respect to Na- and K-feldspar, K-mica, and kaolinite; carbonate terrane lakes are in equilibria with respect to kaolinite-gibbsite; highly productive lakes (Erie during blooms) are deficient in silica.

(6) Interstitial water approaches saturation with respect to Na- and Ca-montmorillonite, amorphous silica, and K-mica.

(7) There is a marked uptake of Mg^{+2} in sediments going from igneous terranes to carbonate rock terrane.

(8) The western end of Lake Erie reaches 10^4 times supersaturation with respect to $Ca_{10}(PO_4)_6(OH)_2$, but is almost at equilibria after fall turnover.

(9) There is a dramatic change in equilibria conditions in the vicinity of the thermocline.

CRUISE E 67-1-04

This cruise attempted to bridge biological and chemical data. The biological data are in Tables 1 and 2 and consist of individual enumeration and total biomass.

These data were joined with the raw chemical data and calculated chemical data and analyzed by factor analysis using varimax rotation. The key relationships defined are:

(1) P_{CO_2} is inversely related to P_{O_2}.

(2) $CaCO_3$ saturation increases as $CaMg(CO_3)_2$ saturation and is inversely related to P_{CO_2}.

(3) P_{CO_2} is directly related to total biomass and inversely related to P_{O_2}.

(4) Rotifera are inversely related to depth.

(5) Conductivity is directly related to Na^+, Cl^-, and $SO_4^=$ concentrations.

(6) SiO_2 is related to Calanoida.

TABLE 1. ZOOPLANKTON ANALYSIS, LAKE ERIE CRUISE E 67-1-04

Station	Depth	Daphnia	Immature Daphnia	Bosminida	Calanoida	Cyclopoda	Leptodora	Nauplius	Rotifera	Total
85-C	13.0	118.5	21.2	8.5	12.7	152.0	0.0	67.8	72.0	452.7
87-A	0.0	16.9	0.0	0.0	42.4	42.4	0.0	38.9	110.0	208.2
B	18.0	110.0	12.7	4.2	33.8	343.0	0.0	114.0	25.4	643.1
C	14.0	135.0	8.6	29.6	0.0	338.0	0.0	182.0	89.0	782.2
88-A	0.0	25.4	0.0	21.2	4.2	406.0	0.0	55.0	51.0	562.8
B	24.0	21.2	0.0	4.2	8.5	42.5	0.0	25.4	42.5	144.1
C	13.0	72.0	12.7	4.2	8.5	156.0	0.0	97.5	72.0	422.9
89-A	0.0	63.5	4.2	8.5	0.0	965.0	0.0	178.0	29.6	1248.8
B	23.0	29.6	8.5	0.0	8.5	46.5	0.0	0.0	25.4	118.5
C	14.0	55.0	0.0	8.5	4.2	55.0	4.2	72.0	55.0	253.9
96-A	0.0	21.2	0.0	0.0	0.0	0.0	0.0	12.7	89.0	122.9
B	15.0	4.2	0.0	0.0	0.0	525.0	0.0	16.9	0.0	546.1
C	6.0	76.3	0.0	0.0	0.0	8.5	0.0	16.9	169.0	270.7
97-A	0.0	12.7	12.7	0.0	0.0	4.2	4.2	21.2	25.4	80.4
B	22.5	131.0	0.0	0.0	0.0	550.0	0.0	67.8	8.5	757.3
C	7.5	161.0	4.2	0.0	33.8	263.0	0.0	29.6	131.0	662.6
98-A	0.0	12.7	0.0	0.0	0.0	63.6	0.0	67.8	165.0	309.1
B	24.0	114.0	4.2	0.0	4.2	203.9	0.0	0.0	4.2	330.5
C	15.0	25.4	21.2	8.5	0.0	267.0	0.0	84.8	93.0	499.9
101-A	0.0	33.8	4.2	0.0	12.7	72.0	0.0	16.9	148.0	387.6
B	19.0	51.0	0.0	0.0	0.0	585.0	0.0	46.5	25.4	707.9
C	17.0	42.4	4.2	0.0	21.2	135.0	0.0	118.5	80.5	401.8
102-A	0.0	67.8	0.0	16.9	21.2	101.0	0.0	21.2	369.0	597.1
B	20.5	97.5	0.0	4.2	0.0	500.0	0.0	84.8	12.7	699.2
C	13.0	131.0	0.0	0.0	38.1	161.0	0.0	106.0	51.0	487.1
103-A	0.0	21.2	0.0	8.5	21.2	76.3	0.0	25.4	186.0	338.6
B	17.0	93.0	4.2	16.9	21.2	254.0	0.0	42.4	21.2	452.9
C	11.5	135.0	12.7	0.0	25.4	80.5	0.0	51.0	80.5	385.1
105-A	0.0	29.6	12.7	46.5	12.7	55.0	0.0	59.4	334.0	550.9
B	16.5	21.2	4.2	0.0	4.2	173.0	0.0	169.0	16.9	388.5
C	8.0	67.8	25.4	46.5	0.0	51.0	0.0	59.4	203.0	453.1

TABLE 1 (Continued)

Station	Depth	Daphnia	Immature Daphnia	Bosminida	Calanoida	Cyclopoda	Leptodora	Nauplius	Rotifera	Total
108-A	0.0	101.2	4.2	12.7	0.0	42.4	0.0	29.6	242.0	432.1
B	17.7	97.5	4.2	8.5	25.4	352.0	0.0	242.0	55.0	784.6
109-A	0.0	55.0	0.0	0.0	0.0	21.2	0.0	21.2	259.0	356.4
B	21.0	110.0	0.0	29.6	0.0	907.0	4.2	208.0	46.5	1305.3
C	18.0	59.4	0.0	21.2	0.0	114.0	0.0	101.5	25.4	321.5
110-A	0.0	46.5	0.0	4.2	0 0	38.1	0.0	21.2	38.1	148.1
B	23.0	110.0	29.6	12.7	0.0	369.0	4.2	110.0	25.4	660.9
C	18.0	84.8	8.5	0.0	0.0	80.5	0.0	63.5	21.2	258.5
111-A	0.0	97.5	4.2	93.0	4.2	135.0	0.0	63.5	118.5	515.9
B	20.5	101.5	12.7	29.6	0.0	415.0	0.0	76.3	46.5	681.6
C	8.0	144.0	4.2	33.8	8.5	156.0	0.0	42.4	186.0	574.9
114-A	0.0	21.2	4.2	0.0	0.0	25.4	0.0	63.5	144.0	258.3
B	13.0	29.6	0.0	0.0	0.0	190.0	0.0	93.0	21.2	333.8
118-A	0.0	106.0	51.0	8.5	0.0	67.8	0.0	33.8	232.5	499.6
B	15.0	4.2	4.2	0.0	4.2	135.0	0.0	131.0	21.2	299.8
123-A	0.0	21.2	8.5	8.5	4.2	51.0	0.0	63.5	173.5	330.4
B	0.0	42.4	0.0	4.2	0.0	93.0	0.0	72.0	152.0	363.6
125-A	0.0	46.5	0.0	4.2	4.2	55.0	0.0	63.5	178.0	351.4
B	17.0	42.4	0.0	25.4	21.2	330.0	0.0	59.4	16.9	495.3
C	12.0	80.5	29.6	4.2	8.5	464.0	0.0	194.0	51.0	531.9
130-A	0.0	123.0	4.2	0.0	12.7	46.5	0.0	25.4	156.0	367.8
B	12.5	152.0	0.0	0.0	4.2	106.0	0.0	63.5	220.0	545.7
135-A	0.0	381.1	8.5	16.9	12.7	97.5	0.0	38.1	72.0	281.8
B	16.0	46.5	4.2	4.2	0.0	165.0	0.0	114.0	42.4	376.3
138-A	0.0	144.0	0.0	16.9	12.7	29.6	4.2	38.1	63.5	309.0
B	15.0	42.4	4.2	0.0	0.0	139.9	0.0	42.4	12.7	241.6
141-A	0.0	76.3	4.2	12.7	4.2	72.0	0.0	51.0	229.0	449.4
B	12.5	55.0	4.2	12.7	4.2	80.5	0.0	59.4	148.0	364.0
143-A	0.0	51.0	21.2	4.4	16.9	67.8	0.0	46.5	55.0	300.8
B	9.5	25.4	4.2	4.2	12.7	173.5	0.0	38.1	29.6	287.7
145-A	0.0	51.0	8.5	21.2	12.7	33.8	0.0	42.4	73.5	343.1
B	0.0	42.4	4.2	0.0	38.1	46.5	0.0	38.1	156.0	325.3

TABLE 1 (Concluded)

Station	Depth°	Daphnia	Immature Daphnia	Bosminida	Caladoida	Cyclopoda	Leptodora	Nauplius	Rotifera	Total
147-A	0.0	38.1	4.2	4.2	12.7	33.8	0.0	55.0	161.0	309.0
B	12.0	33.9	4.2	4.2	0.0	59.4	0.0	93.0	63.5	258.0
149-A	0.0	72.0	0.0	16.9	8.5	101.5	0.0	16.9	55.0	270.8
B	12.5	93.0	0.0	42.4	16.9	161.0	0.0	80.5	135.0	528.8
151-A	0.0	33.8	0.0	25.4	0.0	84.8	0.0	72.0	263.0	479.0
B	10.5	76.3	0.0	38.1	4.2	135.0	0.0	144.0	292.0	689.6
154-A	0.0	21.2	0.0	101.5	4.2	76.3	0.0	101.5	415.0	719.7
B	9.0	46.5	12.7	8.5	0.0	42.4	4.2	51.0	127.0	292.3

TABLE 2. BIOMASS OF PLANKTON SAMPLES FROM LAKE ERIE (mg/ℓ)

Station	Concentration	Station	Concentration	Station	Concentration
87-A	.402	105-A	.482	138-A	.823
B	.562	B	.572	B	.422
C	.763	C	.914	141-A	2.028
88-A	.823	108-A	.542	B	.552
B	.602	B	.331	143-A	.472
C	.331	109-A	.303	B	.623
89-A	.924	B	.803	145-A	.522
B	.422	C	.562	B	.633
C	.785	110-A	.522	147-A	.181
96-A	.512	B	.602	B	.602
B	.201	C	.151	149-A	.241
C	.100	111-A	.502	B	.743
97-A	.422	B	.594	151-A	.763
B	.783	C	1.014	B	.442
C	.623	114-A	.562	154-A	.783
98-A	.502	B	.331	B	.683
B	.522	118-A	.904	157-A	.663
C	.221	B	.382	B	.241
101-A	.241	123-A	.442	159-A	.181
B	.723	B	.303	B	.201
C	.623	125-A	.303	162-A	.231
102-A	.462	B	.552	B	.261
B	.361	C	.643	164-A	.703
C	.141	130-A	.703	B	.341
103-A	.572	B	.623	168-A	.612
B	.623	135-A	.442	B	.703
C	1.004	B	.402	170-A	1.104

The key relationship between chemistry and biology is shown by factor 3. The inverse oxygen-carbon dioxide relationship is no doubt due to the high oxygen demand of carbon materials in the lake. <u>All chemical and biological variables are at least weakly associated with this relationship</u>. Therefore decrease in oxygen demand and/or increase in oxygen supply seems to be the chief requirement for increasing the water quality of Lake Erie. This relationship is even more striking statistically if only data for bottom water are analyzed.

In conclusion it is interesting to note that noncarbonate rock terrane lakes have excess CO_2 but normally have sufficient oxygen. These lakes, however, are easily degraded and rapidly reach the low oxygen-high CO_2 condition of Lake Erie. The carbonate buffering system may indirectly have a strong effect on the assimilative powers of the lake.

APPENDIX I

LAKE WATER REDUCTION PROGRAM USING STANDARD DATA FORMAT

```
$ COMPILE FORTRAN, PUNCH OBJECT, I/O DUMP,EXECUTE                 LAKW 001
C        LAKE WATER REDUCTION PROGRAM USING STANDARD DATA FMT
C                        LAKW
C     PROGRAM USES STANDARD DATA FORMAT. FOR VARIABLES ILIST PRINTS RAW
C     DATA IF-1 PRINTS AND PUNCHES DATA(FMT(2I4,I3,I5,I3,A6,I3,F6.1,F5.1
C     F4.0,F6.2,F5.2,IF5.1,F6.1/8F5.1,3A6,A4/5F8.2,2F7.2,2F9.6/3F5.2,
C     I4,2F7.2,I6)). IF +1 PRINTS RAW DATA.
C     FOR ICACO,ICAMG,IPCOO,IIONS,IOHAP,---IF BLANK NO CALC.,+1 CALC.,
C     PLOT F(TEMP),AND IF -1 CALC.,PSOT AS F(TEMP) AND MAP SURFACE VALUES
C     FOR INHSI,IKHSI,IOX,IROX,ISSO,---IF BLANK, NO CALC. IF +1 PLOT AS
C     F(TEMP) AND H4SIO4.
C     IF ILAST IS ANY NONZERO VALUES PROGRAM TERMINATES(COL 23-24).
C     IDPTH SETS MAX DEPTH FOR PROFILE PLOTS. IF ZERO DEPTH IS AUTOMATI
C     CALLY SET BY REFERRING TO THE LAKE (VARIABLE LA).IF IDPTH IS GREAT
C     ER THAN 100, SCALE IS REDUCED BY 10. FOR VALUES BETWEEN 1-100SCALE
C     IS REDUCED BY 2.
C     FOR VARIABLES XLAMA,XLAMI,XLOMA,XLOMI,ARE MIN AND MAX LAT AND LONG
C     FOR MAP MAKING (POLYCONIC PROJ). SET TO THE NEAREST .5 DEGRESS.
C     SCALE IS TRUE MAP SCALE GREATER THAN ONE.
C     CINT IS CONTOUR INTERVAL WHEN COUNTOURING IS REQUESTED.
C     LA IS THE LAKE WHICH IS COVERED BY THESE DATA. THIS VARIABLE HAS
C     SIGNIFICANCE FOR MAKING MAPS AND ONLY WHEN IDPTH=0. LA=1LAKE ONTAR
C     LA=2 L. ERIE + L. ST.CLAIR.. LA=3L. HRON,N. CHANNEL.
C     LOADING...CONTROL CARD.FORMAT NO1. THEN DATA(LAST CARD OF SET HAS
C     A ONE PUNCHED IN COL 72,REPEAT CONTROL CARD AND DATA SET AND LAST
C     DATA CARD IF DESIRED. LAST CARD HAS A ONE PUNCHED IN COL (23-24=IL
C     AST).
C     USES PLOT SUBROUTINES PLOT CALCOMP PLOTER SUBROUTINE PLUS SUB REGRL.
C     IN PROGRAM C=CONCENTRATION, F=ACTIVITY COEFF.,P= LOG(10)(U./X),
C     G= DISSOCIATION CONSTANT,I=LIST AND CONTROL CARD CALC,K=REQD
C     VARIABLE CALC,Q=-LOG(THEORETICAL EQUIL CONST),S=LOG SAT,+ IF SAT..
C     **********  MAP AND COUNTOURING NOT DONE YET.  NO S-SO4 YET*******
C
      COMMON X,Y,U,V,Z
  200 REWIND4
      DIMENSION COMM(6),DESC(12),GRAPH(3000),ISL(2000),U(2000),V(2000),X
     1(2000),Y(2000),Z(2000),N(5),TG(60),YG(60)
      I=1
      IK=4
      IEND=0
      KTR=51
C
C     READ IN THE CONTROL CARD
      READ INPUT TAPE 7,1, ILIST,ICACO,ICAMG,IPCOO,IIONS,IOHAP,INHSI,IKH
     1SI,IOX,IROX,ISSO,ILAST,IDPTH,XLAMA,XLAMI,XLOMA,XLOMI,SCALE,CINT,LA
    1 FORMAT(12I2,I3,4F4.0,F7.0,F5.0,I3)
C
      IF (ILAST) 999,201,999
C     READ IN THE CRUISE DESCRIPTION
  201 READ INPUT TAPE 7,2, (DESC(K),K=1,12)
    2 FORMAT (12A6)
C
C     PRINT OUT THE CRUISE DESCRIPTION AND HEADER
      WRITE OUTPUT TAPE 6,3,(DESC(K),K=1,12)
    3 FORMAT (1H1,25X,12A6///3X,1HI,3X,3HLAT,5X,4HLONG,3X,5HCRUIS, 1X,2H
     1ST,1X,5HDEPTH,1X,4HTEMP,1X,3HCON,3X,2HPH,3X,3HALK,2X,2HO2,3X,2HPS,
     23X,4HPHOS,1X,4HSIO2,2X,2HCL,3X,3HSO4,2X,2HNA,4X,1HK,3X,2HCA,3X,2HM
     3G,4X,1HF,2X,15HSTATION COMMENT/5X,16H--DEG, MIN*10.--,12X,1HM,4X,1
     4HC,2X,5HMUMHO,6X,5HMEQ/L,2X,3HPPM,6X,6HPPB(P),1X,3HPPM,7(2X,3HPPM)
     5///)
```

```
    4 KCACO=1
      PCACO=-1.
      SCACO=9999.
      KCAMG=1
      PCAMG=-1.
      SCAMG=9999.
      KPCOO=1
      PPCOO=-1.
      KOHAP=1
      POHAP=-1.
      SOHAP=9999.
      KNHSI=1
      PNHSI=-1.
      KKHSI=1
      PKHSI=-1.
      PCMSI=-1.
      KOX=1
      ISOX=-1
      KROX=1
      EHROX=9999.
      KSSO=1
      EHSSO=9999.
      SION=0.
      ANA=0.
      AMG=0.
      ACA=0.
      AK=0.
      ASO=0.
      ACO=0.
      APO=0.
      KTR1=0
      KTR2=0
      KTR3=0
      MAD=0
      IEL=9999
C
C     READ IN THE RAW DATA
      READ INPUT TAPE 7,5,ICT,LATD,LATM,LONGD,LONGM,CRUSE,KSTA,DEPTH,TEM
     1P,COND,PH,ALK,OO,PS,CP,IEND,CSI,CCL,CSO,CNA,CK,CCA,CMG,CF,(COMM(K)
     2,K=1,5)
    5 FORMAT (I2,I4,I3,I5,I3,A6,I3,F6.1,F5.1,F4.0,F6.2,F5.2,2F5.1,F6.1,
     1I4/8F5.1,5A6)
      IF (IEND) 1000,6,1000
    6 IF (ILIST)   7,12,7
    7 IF(IK-KTR) 600,600,8
    8 MAD=MAD+1
      KTR=KTR+53
      WRITE OUTPUT TAPE 6, 9,MAD
    9 FORMAT (128HWHEN NOTE=1, IONIC STRENGTH CALCULATED FROM CONDUCTIVI
     1TY. =2, IONIC STRENGTH ASSUMED ZERO. =3, IONIC STRENGTH GREATER TH
     2AN .005./87HWHEN A SATURATION IS NEGATIVE, UNDERSATURATION OCCURS.
     3 WHEN POSITIVE, SUPERSATURATION.//62X,4HPAGE,I4)
      WRITE OUTPUT TAPE 6,10
   10 FORMAT (1H1,3X,1HI,3X,3HLAT,5X,4HLONG,3X,5HCRUIS, 1X,2HST,1X,5HDEP
     1TH,1X,4HTEMP,1X,3HCON,3X,2HPH,3X,3HALK,2X,2HO2,3X,2HPS,3X,4HPHOS,1
     2X,4HSIO2,2X,2HCL,3X,3HSO4,2X,2HNA,4X,1HK,3X,2HCA,3X,2HMG,4X,1HF,2X
     3,15HSTATION COMMENT/5X,16H--DEG, MIN*10.--,12X,1HM,4X,1HC,2X,5HMUM
     4HO,6X,5HMEQ/L,2X,3HPPM,6X,6HPPB(P),1X,3HPPM,7(2X,3HPPM)///)
  600 WRITE OUTPUT TAPE 6,11,I,LATD,LATM,LONGD,LONGM,CRUSE,KSTA,DEPTH,TE
     1MP,COND,PH,ALK,OO,PS,CP,CSI,CCL,CSO,CNA,CK,CCA,CMG,CF,(COMM(K),K=1
```

```
     2,3)
  11 FORMAT (2I4,I4,I5,I4,A6,I3,F6.1,F5.1,F4.0,F6.2,F5.2,2F5.1, F6.1,7F
     15.1,F5.2,3A6)
C
C      TEST FOR PRESENCE OF REQUIRED VARIABLES.
  12 IF (PH+1.) 16,16,13
  13 IF (ALK+1.) 17,17,14
  14 IF (CCA+1.) 18,18,15
  15 IF (CMG+1.) 19,19,20
  16 KSSO=-1
     KROX=-1
     KNHSI=-1
     KKHSI=-1
  17 KPCOO=-1
  18 KOHAP=-1
     KCACO=-1
  19 KCAMG=-1
  20 IF (CP+1.) 21,21,22
  21 KOHAP=-1
  22 IF (CSI+1.) 24,24,23
  23 IF (CK+1.) 25,25,26
  24 KNHSI=-1
  25 KKHSI=-1
  26 IF (CNA+1.) 27,27,28
  27 KNHSI=-1
  28 IF (OO+1.) 29,29,30
  29 KOX=-1
     KROX=-1
  30 IF (PS+1.) 32,32,31
  31 IF (CSO+1.) 32,32,33
  32 KSSO=-1
  33 TEMPK=TEMP+273.16
C
C      CALCULATE IONIC STRENGTH
     IF (CNA) 42,34,34
  34 IF (CK) 42,35,35
  35 IF (CCA) 42,36,36
  36 IF (CMG) 42,37,37
  37 IF (CSO) 42,38,38
  38 IF (CCL) 42,39,39
  39 IF (ALK) 42,48,48
  42 IF (COND) 45,43,43
  43 KTR1=1
     SIONS=(-8.695*.00001)+(1.835*.00001*COND)
     SION=SIONS
     GO TO 51
  45 KTR2=2
     SIONS=0.
     GO TO 54
  48 SIONS=.5*((CNA/22990.)+(CK/39102.)+(CMG*4./24312.)+(CCA*4./40080.)
    1+(CSO*4./96060.)+(CCL/35453.)+(ALK/1000.))
     IEL=(CCA/100.2+CMG/60.78+CNA/114.95+CK/195.51-CSO/240.15-CCL/177.1
    15-ALK/5.)/(CCA/20040.+CMG/12156.+CNA/22990.+CK/39102.+CSO/48030.+
    2CCL/35430.+ALK/1000.)
     IF (COND) 51,50,50
  50 SION=(-8.695*.00001)+(1.835*.00001*COND)
  51 IF (SIONS-.005) 54,52,52
  52 KTR3=3
C
C      COMPUTE CONSTANTS A AND B IN DEBYE HUCKEL EQUATION
```

```
   54 A=0.48831+7.4136*10.0**(-4.0)*TEMP+2.6429*10.0**(-6.0)*TEMP**2.0
      B=0.32409+1.7429*10.0**(-4.0)*TEMP-5.7152 *10.0**(-7.0)*TEMP**2.0
      RIONS=SQRT(SIONS)
C
C     COMPUTE INDIVIDUAL ACTIVITY COEFFICIENTS FROM DEBYE HUCKEL EQN.
C     CALCULATE ACTIVITIES
      IF (CNA) 57,57,56
   56 PNA=ELOG(22990./CNA)/2.30259
      PFNA=(A*RIONS)/(1.+4.25*B*RIONS)
      FNA=EXP(2.30259*(-PFNA))
      PANA=PFNA+PNA
      ANA=EXP(2.30259*(-PANA))
   57 IF(CK) 59,59,58
   58 PK=ELOG(39102./CK)/2.30259
      PFK=(A*RIONS)/(1.+3.*B*RIONS)
      FK=EXP(2.30259*(-PFK))
      PAK=PFK+PK
      AK=EXP(2.30259*(-PAK))
   59 IF (CCA) 61,61,60
   60 PCA=ELOG(40080./CCA)/2.30259
      PFCA=(A*4.0*RIONS)/(1.+6.*B*RIONS)
      FCA=EXP( 2.30259*(-PFCA))
      PACA=PFCA+PCA
      ACA=EXP( 2.30259*(-PACA))
   61 IF (CMG) 65,65,62
   62 PMG=ELOG(24312./CMG)/2.30259
      PFMG=(A*4.0*RIONS)/(1.+8.*B*RIONS)
      FMG=EXP( 2.30259*(-PFMG))
      PAMG=PFMG+PMG
      AMG=EXP(2.30259*(-PAMG))
   65 IF (CCL) 67,67,66
   66 PCL=ELOG(35430./CCL)/2.30259
      PFCL=(A*RIONS)/(1.+3.*B*RIONS)
      FCL=EXP(2.30259*(-PFCL))
      PACL=PFCL+PCL
      ACL=EXP(2.30259*(-PACL))
C
C     CALCULATE TEMPERATURE DEPENDENT CONSTANTS.
  67  IF (CF) 71,71,70
   70 PFF=(A*RIONS)/(1.+3.5*B*RIONS)
      FF=EXP(2.30259*(-PFF))
      GMGF=EXP(2.30259*(1.19-.01*TEMPK))
      AF=CF/(1./FF+AMG/(FF*GMGF))
      PAF=ELOG(1./AF)/2.30259
   71  IF (CSO) 73,73,72
   72 PFSO=(A*4.0*RIONS)/(1.+4.25*B*RIONS)
      FSO=EXP( 2.30259*(-PFSO))
      ASO=CSO/(1.0/FSO+ANA/(FSO*10.**(-.72))+ACA/10.**(-2.31)+AMG/10.**
     1(-2.36)+AK/(FK*10.**(-.96)))
      PASO=ELOG(1./ASO)/2.30259
   73 IF (PH) 109,109,74
   74 GH2O = EXP(2.30259*(-14.955+0.04445*TEMP-(2.35*10.**(-4.))*TEMP**2
     1.))
C     FOR 0-30   ACKERMANN ZEITSCHRIFT ELEKTROCHEMIE 1958 V62 P411
C
      CH=EXP(2.30259*(-PH))
      POH=ELOG(CH/GH2O)/2.30259
   75 IF (ALK) 92,92,76
   76 PFCO=(A*4.0*RIONS)/(1.+4.5*B*RIONS)
      FCO=EXP(2.30259*(-PFCO))
```

```
      PFHCO=(A*RIONS)/(1.+4.25*B*RIONS)
      FHCO=EXP(2.30259*(-PFHCO))
      GHCO=EXP(2.30259*(-10.625+.01467*TEMP-1.17*10.**(-4.0)*TEMP*TEMP))
      ACO=ALK*10.**(-3.)/(2./FCO+2.*ACA*10.**3.2+2.*AMG*10.**3.4+2.*ANA/
     1(FHCO*10.**(-1.27))+CH/(FHCO*GHCO)+CH*ACA/(FHCO*GHCO*10.**(-1.26))
     2+AMG*CH/(FHCO*GHCO*10.**(-1.16))+ANA*CH/(FHCO*GHCO*10.**(.25)))
      PGCO=18.161+(TEMP-30.)**2. /5555.
      AHCO=CH*ACO/GHCO
      PACO=ELOG(1./ACO)/2.30259
   77 IF (CP) 79,79,78
   78 PFHPO=(A*RIONS)/(1.+4.*B*RIONS)
      FHPO=EXP(2.30259*(-PFHPO))
      PFH2P=PFNA
      FH2P=EXP(2.30259*(-PFH2P))
      GH2P =EXP(2.30259*((-2073.0)/TEMPK+5.9884-.020912*TEMPK))
      GHPO=EXP(2.30259*(-16.832+1.5*10.**(-2.0)*TEMPK))
C     BJERRUM KGL DANSKE WIDDENSKAB SELSKAB MAT FYS MEDD 1929,9-1,126,
C     132,141
C
      GNAHP=-29.376+.112*TEMPK
      GKHPO=-19.548+.076*TEMPK
      APO=(CP/(3.097*10.**7.))/(CH/(FHPO*GHPO)+(CH*CH)/(FH2P*GHPO*GH2P)+
     1(ANA*CH)/(FH2P*GNAHP*GHPO)+(AK*CH)/(FH2P*GKHPO*GHPO)+(AMG*CH)/(10.
     2**(-1.5)*GHPO)+ACA*CH/(10.**(-2.2)*GHPO)+(1.+10.**(-8.3)/CH)*((ACA
     3*ACA*AHCO)/(GHPO*10.**(-1.45))))
      PAPO=ELOG(1./APO)/2.30259
C
C     CALCULATE APPARENT EQUILIBRIUM CONSTANTS.
C     CALCULATE THEORETICAL EQUILIBRIUM CONSTANTS.
C     CALCULATE THEORETICAL/APPARENT AS A MEASURE OF SATURATION.
   79 QCACO=8.023+.0128*TEMP
      QCAMG=16.225+.035*TEMP
      QOHAP=111.69+.0903*TEMP
      IF (ICACO) 80,83,80
   80 IF (KCACO) 83,83,81
   81 PCACO=PACA+PACO
      SCACO=QCACO-PCACO
   83 IF (ICAMG) 84,86,84
   84 IF (KCAMG) 86,86,85
   85 PCAMG=PACA+PAMG+PACO+PACO
      SCAMG=QCAMG-PCAMG
   86 IF(IPCOO) 87,89,87
   87 IF (KPCOO) 89,89,88
   88 PPCOO=PACO+2.*PH-PGCO
   89 IF(IOHAP) 90,92,90
   90 IF (KOHAP) 92,92,91
   91 POHAP=10.*PACA+6.*PAPO+2.*POH
      SOHAP=QOHAP-POHAP
   92 IF (CSI) 99,99,93
   93 PCMSI= ELOG(60085./CSI)/2.30259
      IF (INHSI) 94,96,94
   94 IF (KNHSI) 96,96,95
   95 PNHSI=PH-PANA
   96 IF (IKHSI) 97,99,97
   97 IF (KKHSI) 99,99,98
   98 PKHSI=PH-PAK
   99 IF (IOX) 100,102,100
  100 IF (KOX) 102,102,101
  101 SOO=EXP(2.30259*(1.16435-.011989*TEMP+8.62*10.**(-5.)*TEMP*TEMP))
      SOX=(OO/SOO)*100.
```

```
      ISOX=SOX
      POO=SOX*.2
  102 IF (IROX) 103,109,103
  103 IF (KROX) 109,109,104
  104 EHROX=(.25*(.0329*TEMPK+2.313-.0165*TEMPK*(ELOG(TEMPK)/2.30259)-5.
     1*10.**(-7.)*TEMPK*TEMPK+20./TEMPK)-.5*(.1597*TEMPK-73.70-.0415*TEM
     2PK*(ELOG(TEMPK)/2.30259))/23.060)+2.15437*10.**(-5.)*TEMPK*ELOG(PO
     3O)-1.98425*10.**(-4.)*TEMPK*PH
C     CALCULATIONS OF EH FROM SO4 ARE LEFT OUT FOR THE TIME BEING.
C
C     RECORD RAW DATA AND CALCULATIONS ON TAPE FOR FUTURE READOUT AND
C     USE.
  109 IF (KTR1) 111,111,110
  110 SIONS=0.
  111 WRITE OUTPUT TAPE 4,112,I,LATD,LATM,LONGD,LONGM,CRUSE,KSTA,DEPTH,T
     1EMP,COND,PH,ALK,OO,PS,CP,CSI,CCL,CSO,CNA,CK,CCA,CMG,CF,(COMM(K),K=
     21,4),PCACO,SCACO,PCAMG,SCAMG,PPCOO,POHAP,SOHAP,SIONS,SION,PNHSI,PK
     3HSI,PCMSI,ISOX,EHROX,EHSSO,IEL,KTR1,KTR2,KTR3
  112 FORMAT (2I4,I3,I5,I3,A6,I3,F6.2,F5.1,F4.0,F6.2,F5.2,2F5.1,F6.1,8F5
     1.1,3A6,A4/5F8.2,2F7.2,2F9.6,3F5.2,I4,2F7.2,I6,3I2)
      IF(ILIST)2302,2303,2303
 2302 WRITEOUTPUT TAPE5,2304,I,LATD,LATM,LONGD,LONGM,CRUSE,KSTA,DEPTH,
     1TEMP,COND,PH,ALK,OO,PS,CP,CSI,CCL,CSO,CNA,CK,CCA,CMG,CF,(COMM(K),K
     2=1,4),PCACO,SCACO,PCAMG,SCAMG,PPCOO,POHAP,SOHAP,SIONS,SION,PNHSI,
     3PKHSI,PCMSI,ISO,EHROX,EHSSO,IEL
 2304 FORMAT(2I4,I3,I5,I3,A6,I3,F6.1,F5.1,F4.0,F6.2,F5.2,2F5.1,F6.1/8F5.
     11,3A6,A4/5F8.2,2F7.2,2F9.6/3F5.2,I4,2F7.2,I6)
 2303 I=I+1
      IK=IK+1
      GO TO 4
 1000 KTR=50
      IK=4
      MAD=MAD+1
      WRITE OUTPUT TAPE 6,9,MAD
      WRITE OUTPUT TAPE 6,1002,(DESC(K),K=1,12)
 1002 FORMAT(1H1,25X,12A6///9X,5HCACO3,8X,10HCAMG(CO3)2,14X,4HOHAP,7X,14
     1HIONIC STRENGTH,20X,2HO2/2X,1HI,5X,2HPK,4X,3HSAT,5X,2HPK,4X,3HSAT,
     24X,5HPPCO2,4X,2HPK,5X,3HSAT,4X,4HIONS,4X,4HCOND,3X,4HPN/H,2X,4HPK/
     3H,2X,3HPSI,3X,3HSAT,2X,5HEHROX,2X,5HEHSSO,2X,3HIEL,5X,5HNOTES/36X,
     43HATM,23X,3HM/L,19X,3HM/L,3X,3HO/O,2(2X,5HVOLTS),2X,3HO/O///)
C
C     PRINT OUT THE CALCULATED DATA.
      M=I-1
      REWIND 4
      DO 602 L=1,M
      READ INPUT TAPE 4,1003,I,PCACO,SCACO,PCAMG,SCAMG,PPCOO,POHAP,SOHAP
     1,SIONS,SION,PNHSI,PKHSI,PCMSI,ISOX,EHROX,EHSSO,IEL,KTR1,KTR2,KTR3
 1003 FORMAT (I4,128X/5F8.2,2F7.2,2F9.6,3F5.2,I4,F7.2,F7.2,I6,3I2)
      IF(IK-KTR) 1006,1006,1004
 1004 MAD=MAD+1
      WRITE OUTPUT TAPE 6,9,MAD
      KTR=KTR+52
      WRITE OUTPUT TAPE 6,1005
 1005 FORMAT (1H1,9X,5HCACO3,8X,10HCAMG(CO3)2,14X,4HOHAP,7X,14HIONIC STR
     1ENGTH,20X,2HO2/2X,1HI,5X,2HPK,4X,3HSAT,5X,2HPK,4X,3HSAT,4X,5HPPCO2
     2,4X,2HPK,5X,3HSAT,4X,4HIONS,4X,4HCOND,3X,4HPN/H,2X,4HPK/H,2X,3HPSI
     3,3X,3HSAT,2X,5HEHROX,2X,5HEHSSO,2X,3HIEL,5X,5HNOTES/36X,3HATM,23X,
     43HM/L,19X,3HM/L,3X,3HO/O,2(2X,5HVOLTS),2X,3HO/O///)
 1006 WRITE OUTPUT TAPE 6,1007,I,PCACO,SCACO,PCAMG,SCAMG,PPCOO,POHAP,SOH
     1AP,SIONS,SION,PNHSI,PKHSI,PCMSI,ISOX,EHROX,EHSSO,IEL,KTR1,KTR2,KTR
```

```
    23
 602 IK=IK+1
1007 FORMAT (I4,4F7.2,F7.2,F9.2,F7.2,2F8.5,3F6.2,I5,2F7.2,I6,5X,3I2)
     REWIND 4
     N(1) = 1
     N(2) = 0
     N(3) = +1
     N(4) = 0
     N(5) = -1
     IF(ICACO) 300,301,300
 300 CALL PLOT 1(N,1,50,1,90)
     CALL PLOT2 (GRAPH, 30., 0., 10.2,7.7)
     DO 302 L = 1,M
     READ INPUT TAPE 4, 303,DPT,X(L), Y(L)
     IF (DPT) 801,800,800
 801 CALL PLOT3 (1HX, X(L),Y(L),1)
     GO TO 302
 800 CALL PLOT 3 (1H+, X(L),Y(L),1)
 302 CONTINUE
 303 FORMAT (28X,F6.2,F5.1,93X/F8.2,109X)
     REWIND4
     CALL REGRL (X,Y,M,RCO,SL,A)
     TGA = 0.
     DO304L=1,30
     YG(L) = A+SL*TGA
     TG(L) = TGA
 304 TGA = TGA+1.
     TGA = 0.0
     CALL PLOT3 (1H- ,TG(1),YG(1),30)
     DO 305 L=1,30
     YG(L) = 8.023 + 0.0128*TGA
     TG(L) = TGA
 305 TGA = TGA+1.
     TGA = 0.0
     CALL PLOT3 (1H.,TG(1),YG(1),27)
     CALL PLOT3 (1HC,TG(28),YG(28),1)
     DO 306  L=1,30
     YG(L) = 7.80+0.0132*TGA
     TG(L) = TGA
 306 TGA=TGA+1.
     TGA = 0.
     CALL PLOT3 (1H., TG(1),YG(1),27)
     CALL PLOT3 (1HA, TG(28),YG(28),1)
     WRITE OUTPUT TAPE 6,307
 307 FORMAT (1H1,33X,49HSATURATION OF LAKE WATER RE CALCITE AND ARAGONI
    1TE  /)
     CALL FPLOT4 (38,38H                               NEG LOG CA+CO3)
     WRITE OUTPUT TAPE6,308
 308 FORMAT (1H0,54X,15HTEMPERATURE (C),15X,21HX=CORE,+=WATER SAMPLE//)
     WRITE OUTPUT TAPE 6,309,RCO,A,SL
 309 FORMAT (10X,79HC=CALCITE EQUIL., A=ARAGONITE EQUIL.,---=LINEAR LEA
    1ST SQUARES FIT, CORR. COEFF=,F5.3,6HPCACO=,E10.4,3H + ,E10.4,1HT)
 301 IF (ICAMG) 310,401,310
 310 CALL PLOT 1(N,1,50,1,90)
     CALL PLOT2 (GRAPH,30.,0.,20.5,15.5)
     DO 311 L=1,M
     READ INPUT TAPE4,312,DPT,X(L),Y(L)
     IF (DPT) 803,8C2,802
 803 CALL PLOT3 (1HX,X(L),Y(L),1)
     GO TO 311
```

```
 802 CALL PLOT3 (1H+,X(L),Y(L),1)
 311 CONTINUE
 312 FORMAT (28X,F6.2,F5.1,93X/16X,F8.8,93X)
     REWIND4
     CALL PLOT3 (1H+,X(1),Y(1),M)
     CALL REGRL(X,Y,M,RCO,SL,A)
     TGA = 0.0
      DO313L=1,30
     YG(L) = A+SL*TGA
     TG(L) = TGA
313   TGA=TGA+1.
     TGA=0.0
     CALL PLOT3 (1H-,TG(1),YG(1),30)
      DO314L=1,30
     YG(L) = 16.225+0.035*TGA
     TG(L) = TGA
314   TGA=TGA+1.
     CALL PLOT3(1H.,TG(1),YG(1),30)
     TGA=0.0
     WRITE OUTPUT TAPE6,315
315  FORMAT(1H1,40X,36HSATURATION OF LAKE WATER RE DOLOMITE /)
     CALL FPLOT 4(24,24H       NEG LOG CA+MG+2CO3)
     WRITE OUTPUT TAPE6,308
     WRITE OUTPUT TAPE6,316,RCC,A,SL
 316 FORMAT (10X,46H...=EQUIL., ---=LEAST SQUARES FIT, CORR.COEFF=,F5.3
    1,7HP DOLO=,E10.4,3H + ,E10.4,1HT)
 401 IF(IOHAP) 402,402,603
 603 N(3)=-1
     CALL PLOT 1(N,1,50,1,90)
     CALL PLOT2 (GRAPH,30.,0.,118.,108.)
     DO 317 L=1,M
     READ INPUT TAPE4,604,DPT,X(L),Y(L)
 604 FORMAT (28X,F6.2,F5.1,93X/40X,F7.2,70X)
     IF (DPT) 319,320,320
 319 CALL PLOT3 (1HX,X(L),Y(L),1)
     GO TO 317
 320 CALL PLOT3 (1H+,X(L),Y(L),1)
 317 CONTINUE
     REWIND4
     CALL REGRL(X,Y,M,RCO,SL,A)
     TGA=0.
     DO318L=1,30
     YG(L)=A+SL*TGA
     TG(L)=TGA
318    TGA=TGA+1.
     TGA=0.
     CALL PLOT 3 (1H-,TG(1),YG(1),30)
     DO605L=1,30
     YG(L)= 111.69+0.0903*TGA
     TG(L)= TGA
605   TGA=TGA+1.
     TGA=0.0
     CALL PLOT3 (1H.,TG(1),YG(1),30)
     WRITEOUTPUTTAPE6,606
 606 FORMAT (1H1,29X,57HSATURATION OF LAKE WATER RE HYDROXYAPATITE(10CA
    1+6PO4+2OH)  /)
     CALL FPLOT4 (36,36H                 NEG LOG 10CA+6PO4+2OH)
     WRITE OUTPUT TAPE6,308
     WRITE OUTPUT TAPE6,321,RCC,A,SL
 321 FORMAT (10X,46H...=EQUIL., ---=LEAST SQUARES FIT, CORR.COEFF=,F5.3
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```
   1,7HP OHAP=,E10.4,3H + ,E10.4,1HT)
402 IF (INHSI) 322,322,323
323 N(3)=-1
     CALL PLOT 1(N,1,48,1,90)
    CALL PLOT2 (GRAPH,30.,0.,8.,-4.)
    IM=0
    DO 324 L=1,M
    READ INPUT TAPE4,325,DPT,TEMP,PNHSI,PCMSI
325 FORMAT (28X,F6.2,F5.1,93X/72X,F5.2,5X,F5.2,30X)
    IF (PCMSI) 324,327,327
327 IF (PNHSI) 324,330,330
330 IM = IM+1
    U(IM)=PNHSI
    V(IM)=PCMSI
    X(IM)=PNHSI-PCMSI
    Y(IM)=PNHSI-2.*PCMSI
    Z(IM)=TEMP
    IF(DPT) 328,329,329
328 ISL(IM)=0
    GO TO 324
329 ISL(IM)=1
324 CONTINUE
    REWIND4
    DO 331 L=1,IM
    IF (ISL(L)) 699,699,333
699 CALL PLOT3 (1HX, Z(L),X(L),1)
    GO TO 331
333 CALL PLOT3 (1H+, Z(L),X(L),1)
331 CONTINUE
    WRITE OUTPUT TAPE6,332
332 FORMAT(1H1,29X,56HSATURATION WITH RESPECT TO NA-MONTMORILLONITE--K
   1AOLINITE//)
    CALL FPLOT4 (34,34H               LOG(10) NA+H4SIO4-H)
    WRITE OUTPUT TAPE6,308
    CALL PLOT 1(N,1,40,1,90)
    CALL PLOT2 (GRAPH,30.,0.,6.,2.)
    DO 336 L=1,IM
    IF (ISL(L)) 334,334,335
334 CALL PLOT3 (1HX,Z(L),V(L),1)
    GO TO 336
335 CALL PLOT3 (1H+,Z(L),V(L),1)
336 CONTINUE
    WRITE OUTPUT TAPE6,337
337 FORMAT (1H1,27X,80HSTABILITY WITH RESPECT TO AMORPHOUS SILICA(AS),
   1QUARTZ(Q), AND KAOLINITE-GIBBSITE//)
    TGA=0.
     DO338L=1,30
    YG(L)=0.253+736.4/(273.2+TGA)
    TG(L)=TGA
338  TGA=TGA+1.
    TGA=0.
    CALL PLOT3 (1H.,TG(1),YG(1),27)
    CALL PLOT3 (1HA,TG(28),YG(28),1)
    CALL PLOT3 (1HS,TG(29),YG(29),1)
    DO339L=1,30
    YG(L)=(-0.151)+1162./(273.2+TGA)
339  TGA=TGA+1.
    TGA=0.
    CALL PLOT3(1H.,TG(1),YG(1),27)
    CALL PLOT3(1HQ,TG(28),YG(28),1)
```

```
      TGA = 273.16
      DO 2000 L =1,60
      YG(L) = (0.1611 - 5.571*10.**(-5.)*TGA+.06675*ELOG(TGA)/2.30259-1.
     10554*10.**2./TGA+10.29/(TGA*TGA))/9.1504*10.**(-3.)
 2000 TGA = TGA +.5
      CALLPLOT3(1H.,TG(1),YG(1),56)
       CALLPLOT3(1HK,TG(58),YG(58),1)
      CALLPLOT3(1H-,TG(59),YG(59),1)
      CALLPLOT3(1HG,TG(60),YG(60),1)
      TGA = 0.
      CALL FPLOT4 (27,27H            -LOG(10) H4SIO4)
      WRITE OUTPUT TAPE 6,308
      CALLPLOT1(N,1,52,1,90)
      CALLPLOT2(GRAPH,30.,0.,5.,-8.)
      DO 340 L=1,IM
      IF (ISL(L)) 341,341,342
  341 CALL PLOT3 (1HX,Z(L),Y(L),1)
      GO TO 340
  342 CALL PLOT3 (1H+,Z(L),Y(L),1)
  340 CONTINUE
      WRITE OUTPUT TAPE6,343
  343 FORMAT (1H1,38X, 44HSTABILITY OF NA-FS WITH RESPECT TO KAOLINITE)
      TGA = 273.16
      TGA=0.
      CALL FPLOT4 (38,38H                   LOG(10) NA+2H4SIO4-H)
      WRITE OUTPUT TAPE 6,308
      CALL PLOT 1(N,1,50,1,80)
      CALL PLOT2 (GRAPH,2.,6.,10.,0.)
      DO 344 L=1,IM
      IF (ISL(L)) 345,345,346
  345 CALL PLOT3 (1HX,V(L),U(L),1)
      GO TO 344
  346 CALL PLOT3 (1H+,V(L),U(L),1)
  344 CONTINUE
C     NO BOUNDARIES YET FOR H4SIO4 VS. NA/H.
      WRITE OUTPUT TAPE6,347
  347 FORMAT (1H1,35X,59HSTABILITY AT 5 C WITH RESPECT TO GIBBSITE, KAOL
     1., MONT., AB //)
      CALL FPLOT4 (31,31H                    LOG(10) NA-H)
      WRITE OUTPUT TAPE6,348
  348 FORMAT (1H0,50X,15H-LOG(10) H4SIO4)
  322 IF (IKHSI) 349,349,350
  350 IM = 0
      DO 352 L=1,M
      READ INPUT TAPE4,351,DPT,TEMP,PKHSI,PCMSI
  351 FORMAT (28X,F6.2,F5.1,93X/77X,2F5.2,30X)
      IF (PCMSI) 352, 354,354
  354 IF (PKHSI) 352, 355,355
  355 IM = IM+1
      U(IM) = PKHSI
      V(IM) = PCMSI
      X(IM) = PKHSI-2.*PCMSI
      Y(IM) = PKHSI-3.*PCMSI
      Z(IM) = TEMP
      IF (DPT) 356,357,357
  356 ISL(IM) = 0
      GO TO 352
  357 ISL(IM) = 1
  352 CONTINUE
      REWIND 4
```

```
      CALL PLOT 1(N,1,50,1,90)
      CALL PLOT2 (GRAPH,30.,0.,10.,0.)
      DO 358 L=1,IM
      IF (ISL(L)) 359,359,360
  359 CALL PLOT3 (1HX,Z(L),U(L),1)
      GO TO 358
  360 CALL PLOT3 (1H+,Z(L),U(L),1)
  358 CONTINUE
      TGA=273.16
      CALLPLOT3(1H.,TG(1),YG(1),60)
      TGA=0.
      WRITE OUTPUT TAPE6,361
  361 FORMAT (1H1,47X,33HEQUILIBRIUM MUSCOVITE - KAOLINITE)
      CALL FPLOT4 (31,31H                    LOG(10)  K-H )
      WRITE OUTPUT TAPE6,308
      CALLPLOT1(N,1,52,1,90)
      CALLPLOT2(GRAPH,30.,0.,5.,-8.)
      DO 362 L=1,IM
      IF (ISL(L)) 363,363,364
  363 CALL PLOT3 (1HX,Z(L),X(L),1)
      GO TO 362
  364 CALL PLOT3 (1H+,Z(L),X(L),1)
  362 CONTINUE
      TGA=273.16
      TGA=0.
      WRITE OUTPUT TAPE 6,365
  365 FORMAT (1H1,50X,28HK-FS - KAOLINITE EQUILIBRIUM)
      CALL FPLOT4 (37,37H                    LOG(10) K+2H4SIO4-H)
      WRITE OUTPUT TAPE 6,308
      CALL PLOT 1(N,1,40,1,90)
      CALL PLOT2 (GRAPH,30.,0.,4.,-16.)
      DO 366 L=1,IM
      IF (ISL(L)) 367,367,368
  367 CALL PLOT3 (1HX,Z(L),Y(L),1)
      GO TO 366
  368 CALL PLOT3 (1H+,Z(L),Y(L),1)
  366 CONTINUE
      TGA=273.16
      CALLPLOT3(1H.,TG(1),YG(1),56)
      CALLPLOT3(1HM,TG(58),YG(58),1)
      CALLPLOT3(1HG,TG(59),YG(59),1)
      TGA=273.16
      TGA=0.
      WRITE OUTPUT TAPE6,369
  369 FORMAT (1H1,38X,54HSTABILITY MUSCOVITE-GIBBSITE(MG) AND MUSCOVITE-
     1KFS(MK))
      CALL FPLOT4 (29,29H        LOG(10) K+3H4SIO4-H)
      WRITE OUTPUT TAPE 6,308
      CALL PLOT 1(N,1,50,1,80)
      CALL PLOT2 (GRAPH,2.,6.,10.,0.)
      DO 370 L=1,IM
      IF (ISL(L)) 371,371,372
  371 CALL PLOT3 (1HX,V(L),U(L),1)
      GO TO 370
  372 CALL PLOT3 (1H+,V(L),U(L),1)
  370 CONTINUE
C     NO BOUNDARY DATA K/H VS H4SIO4 YET.
      WRITE OUTPUT TAPE6,373
  373 FORMAT (1H1,35X,60HSTABILITY AT 5C WITH RESPECT TO GIBBSITE KAOL.
     1KFS MUSCOVITE//)
```

```
      CALL FPLOT4 (30,30H
      WRITE OUTPUT TAPE 6,308
 349   IF(IDPTH)3490,4000,3490
 4000 IF(LA-2)4001,4002,4003
 4001 ND=60
      DP=300.
C     LAKE ONTARIO DEPTH IS SET
      GOTO 374
 4002 ND=70
      DP=70.
C     LAKE ERIE-LAKE ST CLAIR DEPTH IS SET
      GOTO 374
 4003 ND=50
      DP=50.
 3490 IF(IDPTH-100)376,376,377
  376 ND=IDPTH
      DP = IDPTH
      GO TO 374
  377 ND = IDPTH/10
      DP = IDPTH
  374 IF (IPCOO) 378,375,378
  378 CALL PLOT1(N,1,ND,1,80)
      CALL PLOT 2 (GRAPH,2.,4.,0.,DP)
      DO 379 L=1,M
      READ INPUT TAPE4,380,DPT,PPCO
  380 FORMAT (28X,F6.2,98X/32X,F8.2,77X)
  379 CALL PLOT3 (1H+,PPCO,DPT,1)
      REWIND4
      WRITE OUTPUT TAPE6,382
  382 FORMAT (1H1,50X,34HCALCULATED CO2 PRESSURE WITH DEPTH//)
      CALL FPLOT4 (31, 31H                         DEPTH METERS)
      WRITE OUTPUT TAPE6,383
  383 FORMAT (1H0,58X,13H-LOG(10) PCC2)
  375 IF (IOX) 385,384,385
 385  CALL PLOT 1 (N,1,ND,1,55)
      CALL PLOT 2(GRAPH,110.,0.,0.,DP)
      DO 386 L=1,M
      READ INPUT TAPE4,387,DPT,ISOX
  387 FORMAT (28X,F6.2,98X/87X,I4,26X)
      SOX = ISOX
  386 CALL PLOT3 (1H+,SOX,DPT,1)
      REWIND4
      WRITE OUTPUT TAPE6,388
  388 FORMAT (1H1,52X,28HOXYGEN SATURATION WITH DEPTH//)
      CALL FPLOT4 (31,31H                          DEPTH METERS)
      WRITE OUTPUT TAPE6,389
  389 FORMAT (1H0,52X,27HOXYGEN SATURATION (PERCENT))
  384 IF (IROX) 391,390,391
 391  CALL PLOT1(N,1,ND,1,80)
      CALL PLOT2 (GRAPH,1.,-1.,0.,DP)
      DO 392 L=1,M
      READ INPUT TAPE4,393,DPT,PH,EHO
      X(L)= EHO
      Y(L)= PH
  393 FORMAT (28X,F6.2,9X,F6.2,83X/91X,F7.2,19X
  392 CALL PLOT3 (1H+,EHO,DPT,1)
      REWIND4
      WRITE OUTPUT TAPE6,394
  394 FORMAT (1H1,50X,36HEH(FROM O2 AND PH) AS FUNCTION DEPTH//)
      CALL FPLOT4 (31,31H                          DEPTH METERS)
```

```
      WRITE OUTPUT TAPE6,395
  395 FORMAT (1H0.61X,10HEH (VOLTS))
      CALL PLOT1 (N,1,40,1,70)
      CALL PLOT2 (GRAPH,14.,0.,1.,-1.)
      CALL PLOT3 (1H+,Y(1),X(1),M)
      WRITE OUTPUT TAPE6,396
  396 FORMAT (1H1,45X,44HEH - PH FOR LAKE SAMPLES.(EH FROM O2 AND PH)//)
      CALL FPLOT4 (21,21H                          EH)
      WRITE OUTPUT TAPE6,397
  397 FORMAT (1H0,65X,2HPH)
C     NO MAPS OR EHSSO YET.
C     NO CORE VS DEPTH PLOTS.
  390 WRITE OUTPUT TAPE6,398,(DESC(K),K=1,12)
  398 FORMAT (1H1,25X,83HTHE LAST CALCULATION AND PLOT HAS BEEN MADE FOR
     1 DATA WITH THE FOLLOWING DESCRIPTION//35X,12A6/1H1)
      GO TO 200
  999 CALL SYSTEM
      END
```

```
$COMPILE FORTRAN,PUNCH OBJECT,I/O DUMP, EXECUTE                    REGRL001
      SUBROUTINE REGRL(X,Y,NO,RCO,SL,A)
C     LINEAR LEAST SQ FIT TO DIMENSIONED X AND Y DATA
C     DATA ARE X AND Y. NC=NUMBER OF DATA, RCO = SIMPLE CORREL COEFF
C     FITS EQN  Y = A + SL*X
C
      COMMON X,Y
      DIMENSION X(2000),Y(2000)
      SXY = 0.
      SX=0.
      SY=0.
      SXX=0.
      SYY=0.
      ANO=NO
      DO 1 M=1,NO
      SX=SX+X(M)
      SY=SY+Y(M)
      SXY=SXY+X(M)*Y(M)
      SXX=SXX+X(M)**2
      SYY=SYY+Y(M)**2
       CONTINUE
      IF((ANO*SXX-SX*SX)*(ANO*SYY-SY*SY))2,2,3
      R=99.999
      GOTO4
      RCO=(ANO*SXY-SX*SY)/SQRT((ANO*SXX-SX*SX)*(ANO*SYY-SY*SY))
      SL=(SXY-SX*SY/ANO)/(SXX-SX*SX/ANO)
      A=(SY/ANO)-SL*SX/ANO
      RETURN
      END
```